THE IRON AGE

New York, February 27, 1930

ESTABLISHED 1855 VOL. 125, No. 9

Plant Handles Scrap by Conveyors

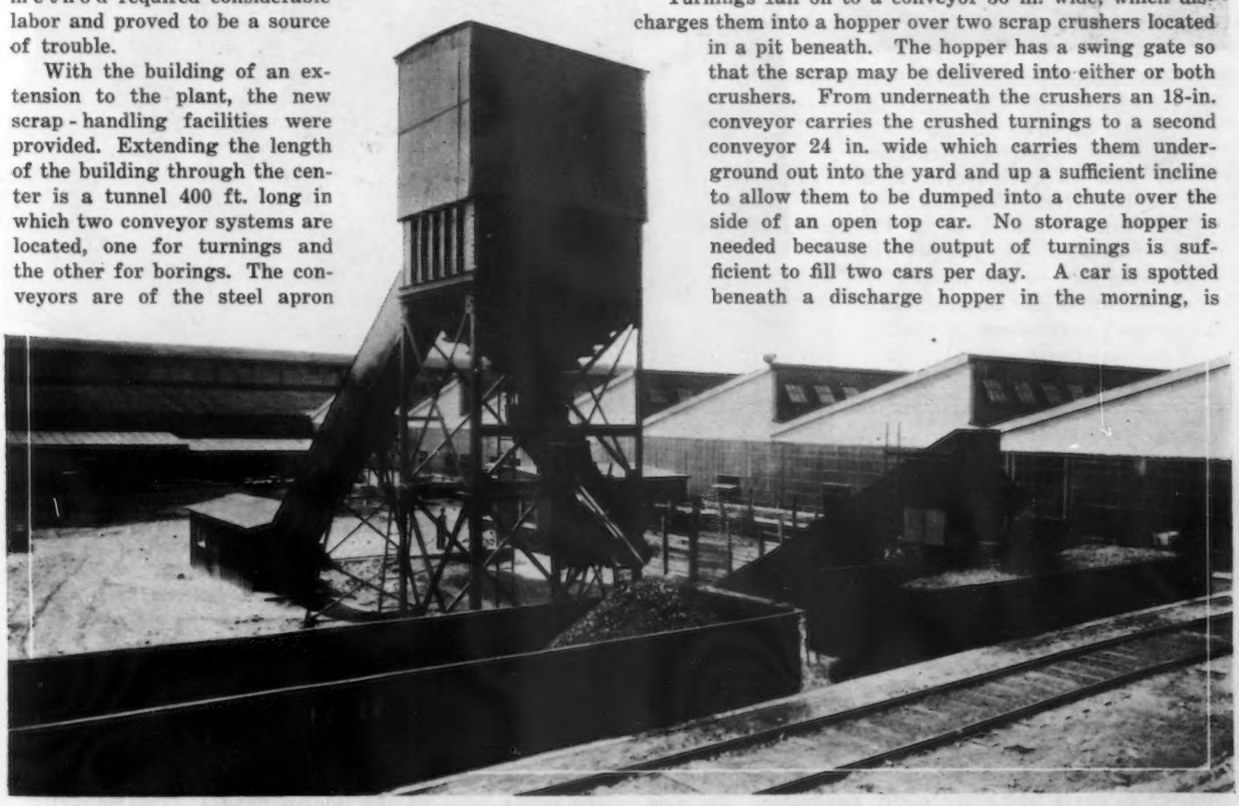
Motor Wheel Corporation, Producing Nearly 100 Tons a Day, Effects Economies by Equipment Which Crushes Turnings and Conveys Them to Freight Cars

ECONOMIES in handling scrap have been effected in the plant of the Motor Wheel Corporation, Lansing, Mich., by the installation of conveyor systems that deliver scrap from the shop to railroad cars. The plant produces about 75 tons of steel turnings and 18 tons of malleable iron borings a day. Before the installation of the conveyors the scrap was gathered in wheelbarrows or shop trucks at the machines, wheeled to the yard where the turnings were crushed and loaded on cars by hand. This method required considerable labor and proved to be a source of trouble.

With the building of an extension to the plant, the new scrap-handling facilities were provided. Extending the length of the building through the center is a tunnel 400 ft. long in which two conveyor systems are located, one for turnings and the other for borings. The conveyors are of the steel apron type. The tunnel is covered by 5/16-in. checker plates with cross member supports which provide a safe load of 250 lb. per sq. ft., which is ample floor strength for loaded trucks. The batteries of machines are located on each side of the tunnel. Scrap is handled from the machines in wheelbarrows and dumped on to the conveyors through hood-covered openings in the floor.

Scrap Crushers Located in Pit

Turnings fall on to a conveyor 36 in. wide, which discharges them into a hopper over two scrap crushers located in a pit beneath. The hopper has a swing gate so that the scrap may be delivered into either or both crushers. From underneath the crushers an 18-in. conveyor carries the crushed turnings to a second conveyor 24 in. wide which carries them underground out into the yard and up a sufficient incline to allow them to be dumped into a chute over the side of an open top car. No storage hopper is needed because the output of turnings is sufficient to fill two cars per day. A car is spotted beneath a discharge hopper in the morning, is

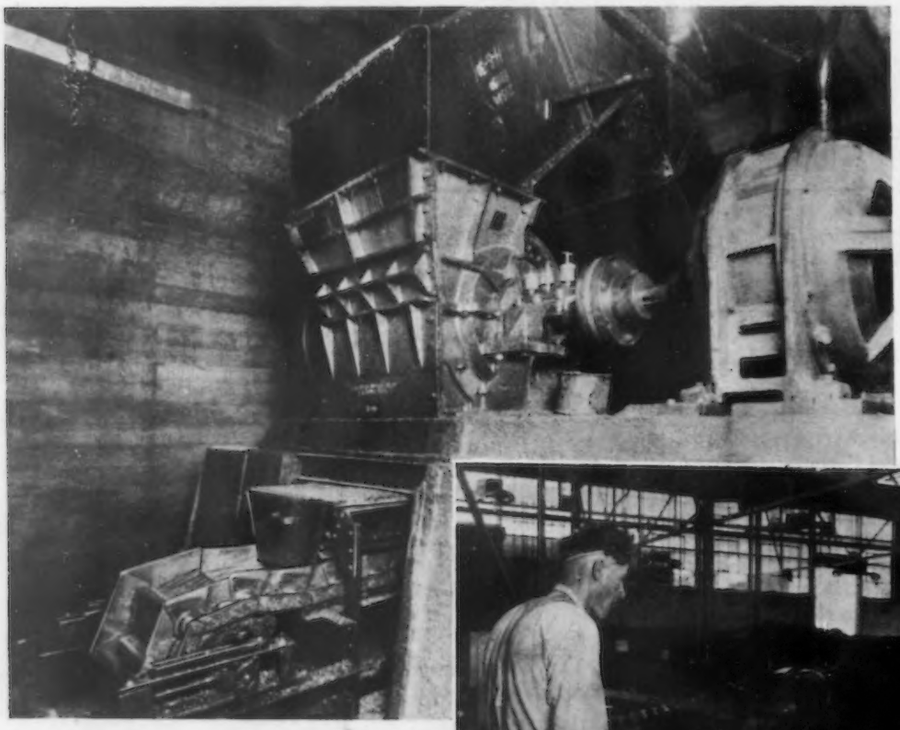


Scrap Is Carried by a Conveyor to a 50-Ton Storage Hopper Located at Side of Railroad Track

loaded by noon and a second car is spotted during the noon hour to be filled during the afternoon.

The conveyor for malleable iron borings, which is 18 in. wide, extends through the crusher pit and delivers the scrap to a cross conveyor. This carries the borings to a 50-ton storage hopper located at the side of the railroad track.

The hopper is equipped with a counterweighted hinged chute which after the car is loaded is lifted vertically against the hopper side to allow clearance for the removal of the car. A steel hopper was provided for this part of the system because the quantity of borings is not sufficient to load a car without paying demurrage charges. It is stated that the saving in demurrage charges in a year is sufficient to pay the cost of building a hopper.



SCRAP Is Handled From the Machines in Wheelbarrows and Dumped On to the Conveyors Through Hood-Covered Openings in the Floor

STEEL Turnings Are Carried on a Conveyor to a Hopper Over Two Crushing Machines Located in a Pit Underneath. The hopper has a swing gate so that scrap may be delivered into either or both crushers

Construction of Conveyor Permits Removing Worn Parts Easily

Two strands of steel bar bushed roller chain with ¼-in. bedded apron pans are used throughout as conveyor mediums. This type of chain was selected as most suitable because it is simple in construction and all wear is confined to parts which are easily removable. The side bars are made of mild steel, the pins of cold-rolled steel and the bushings of seamless steel tubing. Both the pins and bushings are case hardened. The rollers are of white iron and have internal lubrication. The bushings are milled flat on the ends and are rigidly held in the side bars by being fitted into corresponding shaped holes. The pins are held in the side bars by malleable iron keepers, which, in addition to preventing rotation, hold the pins in position laterally, thus dispensing with the use of cotter pins and at the same time providing a chain which can be easily disassembled. The apron conveyor is carried on T-bar rails which are supported at proper intervals with floor frames which are bolted and grouted into the concrete of the floor.

The conveying equipment was designed and erected by the Palmer-Bee Co., Detroit.

Bureau Tests Structural Welds

IN order to help the construction industry obtain safe and economical structures, the Bureau of Standards in cooperation with the American Bridge Co. has investigated welded connections for steel-frame buildings. These included tests on column splices formed by welding plates to the inside faces of the column flanges. The connection was made by bolting splice plates to these welded plates. The tests showed that the connections were adequate in strength to carry the loads for which they were designed.

Galvanizing Pot Destruction

Linking Up Theory and Practice—Overwhelming Influence of High Temperatures—Study of Resultant Alloys

BY WALLACE G. IMHOFF*

PURE research is done with no practical viewpoint in mind. It advances, and opens up new fields of knowledge, and is often not applied in a practical way for years afterward. The discussion here is offered as practical research—that is, research done with a definite viewpoint in mind, and from the angle of immediate practical application of the knowledge obtained.

In discussing the theory of galvanizing pot destruction, the knowledge submitted is the result of a number of years of research work done by the writer, to determine the principles and laws involved in the practical formation of galvanizers' dross, and galvanizing pot destruction. This leans toward the practical side of theory, that is, theory which can be used in practice immediately, rather than theory that is complex, mathematical and intricate, and which to be of value in a practical way must be unraveled, and applied by some other investigator with a practical viewpoint.

From a practical standpoint the theory of galvanizing pot destruction is built largely around two distinct lines of investigation: The influence of temperature in its relation to the contact of molten zinc upon iron (steel), and the dissolving action of the molten zinc (the solubility of the iron in the molten zinc) at different temperatures. Complete knowledge and appreciation of this knowledge, and the proper practical application of it, will greatly reduce the number of failures of galvanizing pots under practical conditions.

Since there are also many other factors involved, such as the composition of the steel, its soundness, oxidation, segregation and mechanical defects caused in rolling and fabricating, it is at once seen that, even with this knowledge, the preserving and lengthening of the life of galvanizing pots is still not a simple matter, but very intricate and complicated, since under practical conditions all the knowledge and principles of combustion engineering are involved also.

This is primarily the reason why more progress in this field has not been made. It has been thought that all that was necessary was to buy a pot, and build a furnace around it. Such procedure, however, entirely ignores the definite principles set forth in this paper, with the result that pots fail in three days, a week, two weeks, six weeks, or a few months.

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These investigations cover mainly the two main phases of galvanizing pot destruction, the influence of temperature, and the solubility of the steel in the zinc. They do not cover a variation in the chemical composition of the steel, but have reduced all variables to a minimum by using one steel base for all temperatures. Other valuables, such as oxidation, segregation, mechanical treatment, fabrication, etc., have been purposely eliminated, also.

For all practical purposes here, the melting point of zinc is 786 deg. Fahr. Since even the investigation of the theoretical phase must be limited to the practical viewpoint, experiments were started with conditions which would give the relation first at 800 deg. The purest commercial brand of slab zinc used for hot galvanizing was used in all the tests. It was obtained from a galvanizing firm using this quality and brand of metal for regular galvanizing practice. An analysis of this zinc shows:

Complete Analysis of a Commercial Zinc

	(Iron by Precipitation)	(Iron by Titration)
Antimony	0.0000	.....
Tin	0.0000	.....
Lead	0.1557	.....
Iron	0.0459	(0.0408)–(0.0343)
Aluminum		
Zinc*	99.7984	.....

*By difference.

The iron content was so low that it was exceedingly difficult to obtain the correct amount by either method.

The pieces of sheet steel used in the investigations were 6 in. square, 28 gage, O.P.C.R. sheets of the standard analysis for this material. No analyses were made of the steel, since it was standard stock.

FIG. 1—Commercial Slab Zinc with Steel Sheet in It, Heated to 800 Deg. Fahr., Held for 6 Hr. and Allowed to Cool Slowly. Magnified 36 diameters (all seven cuts were reduced 28 per cent in reproduction)

Tests Made at Eight Progressive Temperatures

All samples in the test were weighed to within 0.1 gram. The tests were made at the following temperatures: 800 deg., 850 deg., 900 deg., 950 deg., 1000 deg., 1100 deg., 1300 deg. and 1500 deg. Fahr. The tests were conducted in an accurately controlled electric furnace, with a pyrometer and all instruments necessary to give accurate control and definite knowledge of facts and conditions.

As soon as the zinc was melted and at the proper temperature, the iron sheets (pickled clean) were placed in the container. This was of the purest material, containing absolutely no source of iron or other material which would dissolve and contaminate

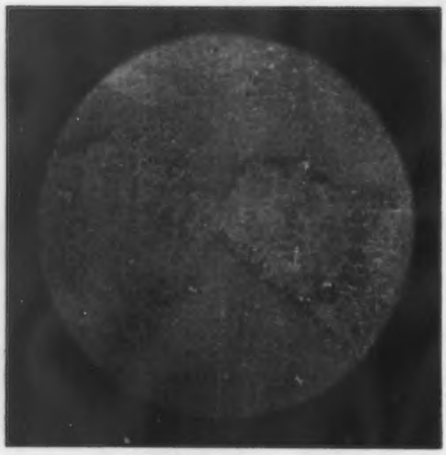

FIG. 2—Polished Surface Directly Under the Steel Sheet of Fig. 1. Melt at 800 deg. and conditions same as Fig. 1. 36 diameters

the zinc. The furnace temperature was then held at the constant required temperature for 6 hr. This ended the test. The switch was then drawn, and the container was allowed to cool slowly with the furnace until cold. (Overnight, in each case.)

In the morning the container was removed and the contents weighed to within 0.1 gram to discover if there was any loss through evaporation of the zinc. A close check on the tests indicated there was no appreciable loss from this cause.

At 800 deg. Fahr. the zinc had melted up and was stuck tightly to the iron sheet; there were some scum, dirt and oxide on top of the melt; the melt was removed easily from the container.

At 850 deg. the zinc had melted evenly around the steel sheet; there were scum, dirt and oxide on top of the zinc.

FIG. 3—Commercial Slab Zinc with Steel Sheet in It Heated to 850 deg., Held for 6 Hr. and Allowed Slowly to Become Cold. 36 diameters

At 900 deg. the zinc was discolored by a purple and blue oxide; the steel sheet was covered with a deep, dark brown-bronze oxide of iron.

At 950 deg. a very visible action of the zinc and iron could be seen.

At 1000 deg. the melt was covered with a brown and blue oxide scum, and cone-like deposits were to be seen against the steel sheet.

At 1100 deg. the melt had a greenish tinge; yellow-bronze zinc oxide and scum were on the top and there was a gorgeous array of colors of light yellow-green and purple near the steel sheet.

At 1300 deg. there was green zinc oxide over the melt. The top of the steel sheet crumbled and broke away from the sample.

At 1500 deg. the melt was again covered with olive green oxide. The top of the sheet crumbled and was easily lifted out of the melt.

The conclusions seen so far from the rough examinations of the melts of all tests are that there is not an

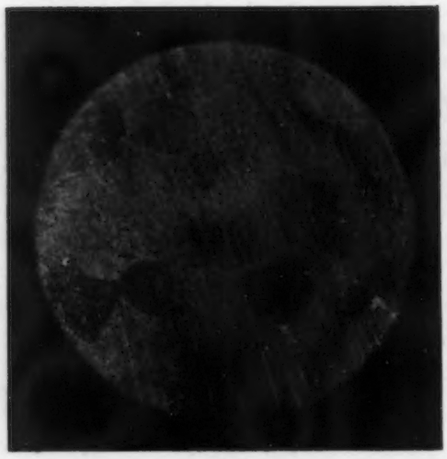

FIG. 4—Polished Section Directly Under the Steel Sheet Shown in Fig. 3. 36 diameters

appreciable loss of the zinc by evaporation, but there is considerable oxidation of the zinc at the higher temperatures.

Study of the Results Obtained

It is of particular interest to see what really happened in all these tests. To do this the samples were all cut, etched and specially prepared for examination under the microscope. With very high magnification the relation to the whole is often lost in interpreting results; with very low magnification important things are not seen. The present series of tests was standardized on a magnification of 36 diameters for all samples. This is large enough to bring out the facts, and still not obliterate their relation to the whole.

Fig. 1 shows the melt after subjecting the steel sheet to the action of the molten zinc at 800 deg. Fahr. for 6 hr., and slowly cooling in the furnace overnight. The section is at right angles to the sheet, and the magnification is 36 diameters. The first feature of particular interest is the large, clear crystals of zinc. The boundary line between two of these crystals can be seen about one-third of the

way down on the left side of the plate. The right side of the plate is all one large zinc crystal.

These crystals do not contain any foreign matter when viewed under low magnification, but are entirely uniform and homogeneous throughout. Under high magnification the crystals contain black specks, but these are so small that not even the crystal form of the zinc-iron alloy can be recognized.

It is important to note the general condition of the zinc in the melt around the steel sheet. Under low magnification there seems to be practically no penetration of the iron into the zinc crystals. Between the zinc crystals and the steel sheet there is an alloy bond. This consists of two distinct bands; a dark iron-zinc band near the steel sheet, and a lighter zinc-iron alloy band next to the zinc crystals. Passing from one to the other there is the steel sheet, the dark iron-zinc alloy band, the light zinc-iron alloy band and the zinc crystals.

This calls attention to the fact that the relation between the two is such that where the iron is in excess the alloy is an iron-rich zinc-iron alloy, and where the zinc is in excess,

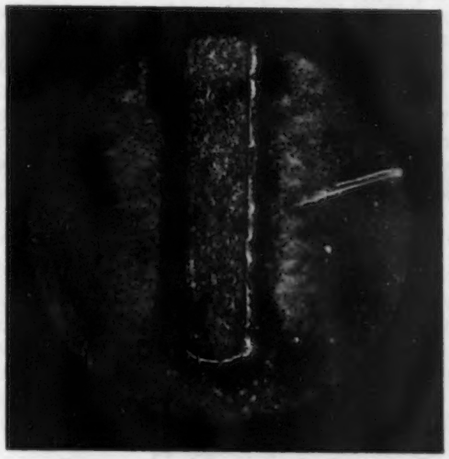

FIG. 5—Commercial Slab Zinc with Steel Sheet in It Heated to 900 deg., Held for 6 Hr. and Allowed Slowly to Become Cold. 36 diameters

the alloy is a zinc-rich zinc-iron alloy. The dark iron-rich zinc-iron alloy is the more brittle of the two. This is seen by the large crack in it (the thin white streak in the plate) made when sawing the specimen for examination under the microscope.

Under high magnification the light alloy next to the zinc crystals is found to contain very small dross crystals floating in the zinc-iron alloy. Also, outside these crystals, and next to the zinc, there is an irregular black material which appears to be dross crystals, but even with the high magnification the individual shapes of the dross crystals (zinc-iron alloy) cannot be made out clearly. The dark, iron-rich, iron-zinc alloy is wider than the light zinc-iron alloy.

Two Separate Alloys Are Formed

Later investigations have shown that all the alloys are really zinc-rich zinc-iron alloys, but to distinguish the two types of alloys they will be for convenience here called zinc-iron alloys when high in zinc and low in iron, and iron-zinc alloys when high in iron and low in zinc

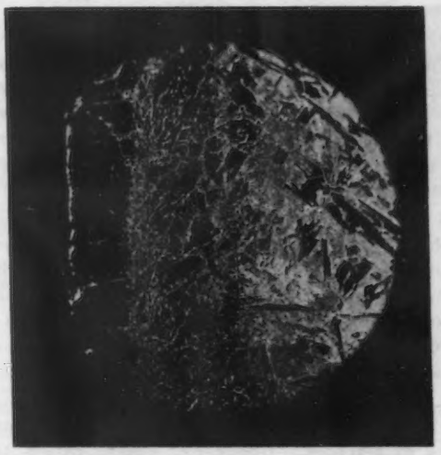

FIG. 6—The Zinc-Iron Alloy from a 16-Ft. Galvanizing Pot Destroyed Under Practical Conditions of Operation. The crystals can be seen breaking up and floating away into the bath. 36 diameters

content. The feature of importance here is to note that there are just two zinc-iron alloys formed, one next to the steel sheet and one next to the zinc.

To ascertain more of the action of the zinc upon the steel the sheet was pulled out of the melt, and the surface of the melt directly under the steel was polished so that it could be examined under the microscope. Fig. 2 shows this surface directly under (or beside) the steel sheet. It is important to see that the alloying action (the dissolving of the iron in the zinc) begins at as low a temperature as 800 deg. Fahr.

Note the two large alloy spots showing the beginning of the transfer of the iron into the zinc. The zinc area is seen above and below these two alloy spots. It might be stated that the sample had to be polished and etched very lightly so that as little as possible of this thin alloy bond would be removed. Attention is called also to the fact

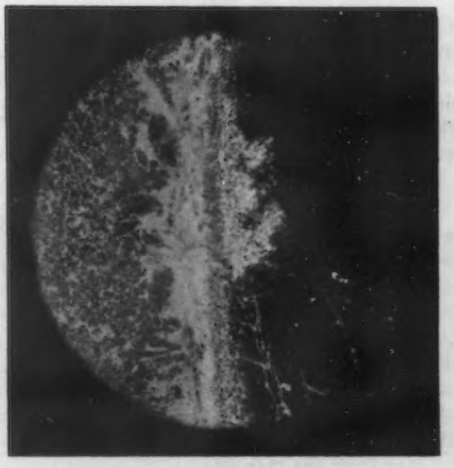

FIG. 7—Polished Surface of the Melt Under the Steel Sheet Shown in Fig. 5. 36 diameters

that the iron has not penetrated the zinc melt to any great depth. This fact is revealed by the zinc areas found inside of these alloy spots.

Fig. 3 shows the steel sheet in the melt at 850 deg. for 6 hr., and then slowly cooled. The section is across the sheet. The magnification is 36 diameters, the same as Fig. 1. It is particularly interesting to compare the action of the molten zinc under identical conditions except for the 50 deg. increase in temperature. The clear, beautiful, medium-sized crystals of zinc can be seen plainly (by moving over the entire field).

Under low magnification these crystals seem absolutely clear of any foreign matter. Even with a high-power objective the zinc crystals are found to be remarkably free from foreign material, or any material which resembles dross (zinc-iron alloy), except for the black specks, which are very small. No distinct dross crystals can be seen.

The condition of the steel sheet appears to be much the same as at 800 deg. Under low magnification there is seen to be very little penetration of the iron into the zinc (iron dissolved by the zinc). The alloy bond between the zinc crystals and the iron sheet seems to be about the same in width.

Under high magnification the dark iron-zinc alloy next to the iron sheet seems to be breaking up into dross crystals, which are floating in the lighter zinc-iron alloy. The light zinc-iron alloy, which was the thinner of the two, and next to the zinc crystals, has now extended clear over to the iron sheet, and large pieces of the dark iron-zinc alloy are floating in it as dross crystals. Note how the width of the zinc-iron alloy (compared with Fig. 1) has spread and widened at the bottom of the sheet.

Fig. 4 is the polished surface directly under the steel sheet shown in Fig. 3. The iron has alloyed with the zinc in all these crystals the same as is shown in Fig. 2. When examined under higher power magnification, the crystals all show alloying action of the zinc and iron. The alloy is found also between the crystals.

Active Action Begins at 900 Deg.

Fig. 5 shows the effect of commercial slab zinc with a steel sheet in it heated to 900 deg., held for 6 hr., and allowed to cool slowly. Again magnification is at 36 diameters. This specimen is exceedingly interesting, showing that the alloying action of the molten zinc has now become exceedingly active. Particular attention is at once called to the increased thickness of the iron-zinc alloy next to the sheet. Also note that the zinc-iron alloy in the zinc area is much wider and has lost its regular outline.

Farther away from the steel sheet the zinc melt seems to be less affected. The large, clear, unaltered, uniform crystals of the zinc can be seen plainly in moving over the field. Under low magnification these crystals appear to be entirely free from foreign matter of any kind. Even under high magnification no traces of zinc-iron alloy or dross crystals are seen back in the zinc area of the melt.

The area in immediate contact with the steel sheet, however, presents interesting features for discussion. Under low magnification there is seen to be comparatively little penetration of the iron into the zinc area. The alloy bond (iron-zinc alloy) can be seen to be considerably wider and, on the side next to the zinc (zinc-iron alloy), countless small crystals of dross are ready to float off into the zinc. Under higher magnification these tiny dross crystals are seen to have penetrated the zinc area a considerable distance from the iron sheet.

At the bottom of the sheet the zinc-iron alloy is flared out for a considerable distance on both sides, and it is seen to be composed of an orderly arrangement of dross crystals which are tending to separate and float off individually into the zinc area. These dross crystals are arranged at right angles to the steel sheet. A few dross crystals are to be seen which have broken away and moved far out into the interior of the zinc area.

Greater Dissolving of Iron Noted

The particular feature of interest to note at 900 deg. Fahr. is the increased penetration of the zinc into the iron; or, stated reversely, the increased dissolving of the iron from the steel sheet. The mechanism of destruction is here revealed. It is as follows: the iron first dissolves into, or alloys with, the zinc in an iron-rich (high iron content) zinc-iron alloy. This iron-rich alloy disintegrates into smaller fragments, dross crystals, which later break up into still smaller fragments as they float off into the zinc melt.

The whole action of destruction seems to be exactly a parallel to ice breaking up from a pond in the winter—the large cakes of ice breaking up into smaller cakes, and finally dissolving in the water as they float off into the clear area. This, then, is the mechanism of the destruction, and this same action takes place in the destruction of large steel galvanizing pots under practical operating conditions.

In Fig. 6 is shown exactly the same disintegration of the heavy zinc-iron alloy at the left of the plate. This alloy is from the side of the 16-ft. galvanizing pot described in detail in THE IRON AGE, Jan. 23, pages 294 to 297. A section 2 ft. square around the hole was cut out of the firebox steel side of the pot after it failed. Fig. 6 shows the iron-rich zinc-iron alloy next to the firebox steel side at the left of the plate. The alloy can be plainly seen to be disintegrating, and the crystals are floating off into the bath at the right of the plate. This process continues until complete destruction of the pot is brought about.

Fig. 7 shows the polished surface of the melt under the sheet shown in Fig. 5. The particular feature of interest in this plate is the thickness of the alloy bond. The zinc-iron alloy (iron-rich) is shown as the opaque area at the right of the plate. Directly through the center in a vertical direction is a line, or area, about ¼ to ⅜ in. wide, the actual thickness of this alloy. On the extreme left the melt is seen with alloy crystals in it.

This illustration seems to bring out the fact that the alloy bond is nothing more than a layer of orderly arranged, or closely packed, dross crystals. The dark area of alloy at the right shows these crystals orderly arranged into a unity—a solid, continuous area. In the area of the melt the zinc is strong enough to break up this unity and the crystals float off as dross crystals.

(To be continued)

Turbo Blowers Have Chromium-Nickel Blades

TWO turbo-blowers, built by Brown-Boveri & Co., have been installed in a German blast furnace plant. At 2900 r.p.m., each draws 2360 cu. m. (83,300 cu. ft.) of air and raises the pressure to 2.5 atmospheres (37 lb. per sq. in.), the power required being 8150 hp. If the furnace hangs, the pressure can be raised to 3.25 atmospheres or 48 lb. per sq. in. (2620 cu. m., or 92,500 cu. ft. of air, 3200 r.p.m., 11,500 hp.). The turbine blades are made of chromium-nickel steel, having a tensile strength of 110 kg. per sq. mm. (156,000 lb. per sq. in.); yield point 75 kg. per sq. mm. (107,000 lb. per sq. in.); elongation 12 per cent, and notch test value 8 kg.-m. per sq. cm. (374 ft.-lb. per sq. in.). The steam turbine will take steam at a temperature of 400 deg. C. and 34 atmospheres (500 lb. per sq. in.) pressure.

Foundries Use Gas for Annealing

Heating Period Shortened in a New Furnace—Savings Compared with Other Fuels—Even Heat Distribution

BY C. B. PHILLIPS*

THE general tendency in the metal industry today is toward alloy steels, and this trend is exerting a decided influence on the process of annealing castings. In fact, it is the opinion of some that the term annealing will eventually become obsolete and that founders will be called upon to furnish heat treated castings. Already these founders are demanding more modern and reliable annealing equipment, that will impart the correct grain structure to the castings and produce the physical characteristics specified by the customer.

After many trials the car bottom type furnace became the accepted design. Coal and oil were tried and abandoned, and then, for no good reason at all, electric furnaces became the style. Economic pressure, however, forced the hand of the foundry industry and gas-fired furnaces made their advent and with a startling result. It was soon proved that roughly a 35 per cent saving was made with gas over electricity, and this with the latter at 1.1c. per kw. and gas of 530 B.t.u. selling for 48c. per 1000 cu. ft.

Economies effected included: A decreased cost for fuel; shorter heating up and holding periods; more uniform heat distribution; exact atmospheric control; and the ability to produce the proper furnace pressure and maintain it automatically throughout the entire heat gradient. In addition to lowering the fuel costs, the use of this furnace increases production and cuts the labor item, while at the same time a better product results. A further increase in output with still less labor is effected by a unique material handling system.

The first of these units was installed at the plant of the Link Belt Co., Chicago, known nationally and internationally for its conveying machinery of all types. The Chicago plant of this company is self-contained from raw material to finished product. It makes its own steel in a 2-ton, side blow converter, with a capacity for 11 blows per day. The steel most commonly used is of the following analysis: Carbon, 0.30; silicon, 0.35; manganese, 0.75; phosphorus, 0.03, and sulphur, 0.035 per cent.

Car Bottom Type Used

The gas-fired, car bottom type of furnace used in this plant for annealing castings was developed, over a period of years, by the engineering and research staff of the Surface Combustion Co., Toledo, Ohio. It has a door at each end and a track running through it, on which the cars of castings are pushed into and through the furnace. This furnace is 10½ ft. wide, 14 ft. long and 5 ft. from the tops of the piers to the crown of the arch. It holds one car, 10 x 14 ft., and will anneal 14,000 lb. of castings at a charge.

LOOKING into Gas-Fired Car Bottom Annealing Furnace with Loaded Car in Position

The walls are composed of 9 in. of firebrick and 7½ in. of insulation, backed up with a reinforced steel casing, while the whole structure is tied together with double channel buckstays and tie rods located at suitable intervals along the sides, front and back. A heavy arch thrust member runs the full length of the furnace on each side at the springline of the arch. The fronts are of heavy cast iron plates, suitably ribbed, and held in place by side plates and buckstays.

Shortening of the heating periods was in part accomplished by using the standard high pressure gas burning equipment of the Surface Combustion system. There are 15 burners to a side, staggered to heat the work both from the top and bottom. These burners are of

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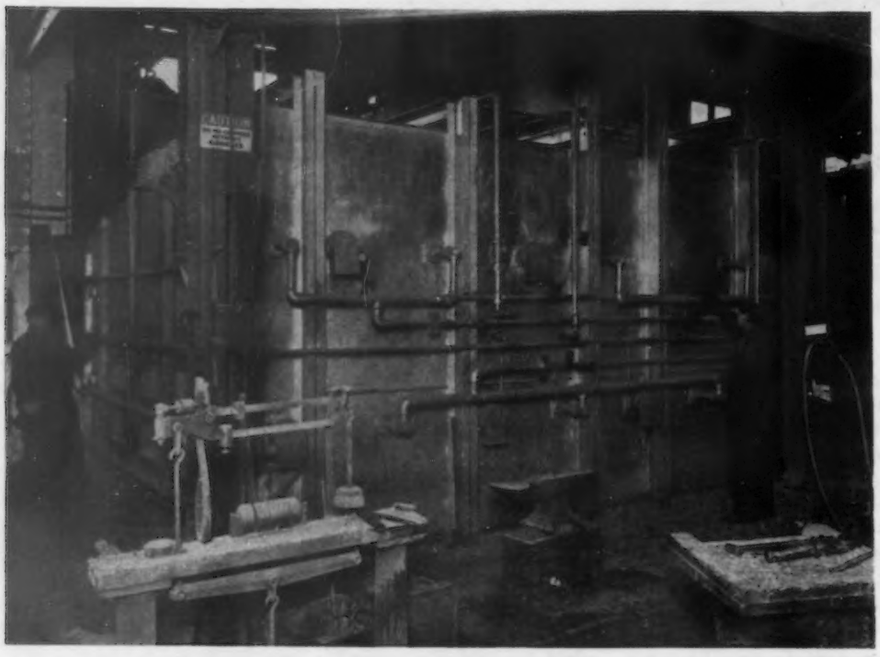


Gas-Firing System on Car Bottom Annealing Furnace for Steel or Iron Castings

two types, one set being the holding burners and of the tunnel type, manifolded to proportioning inspirators, while the others are separate, two-stage velocity burners for heating up. These latter burners are shut off when the furnace is up to temperature and thereafter the holding burners are kept operating at a low rate by means of regulators and check valves in a by-pass line.

Drawing Car from Furnace with Winch at Extreme Left

The gross weight of the charges used in this unit vary from 10 to 14 tons and the heating cycle from 3½ to 5 hr. and 10 min.

Practice at this plant is to heat the steel castings up to 1750 deg. Fahr., which, as stated, takes from 3½ to about 5 hr., and soaking at this temperature for another hour. The burners are then all turned off and the charge withdrawn for cooling. Iron castings are annealed at 1250 deg. Fahr., but instead of cooling in the air they are allowed to cool in the furnace. This cooling cycle can be accelerated to any rate by progressively opening flue dampers, more of which later.

Temperature is automatically controlled, the equipment consisting of two sets of controllers with front dial settings, one set taking care of the upper burners on both sides and the other set the lower burners on both sides. Motor - operated control valves, interconnected with thermocouples and recording pyrometers are provided, and this arrangement allows for the automatic shutting off of the main heating up burners, when the furnace has come up to heat, after which the holding burners are controlled from the by-pass line mentioned above.

The feature of two-stage inspiration applied to the high pressure velocity burners practically eliminates the backfire or flash back which occurs at low rates of gas consumption, with the standard high pressure equipment. The specific operating range for this new apparatus has a turndown of from 8 or 9 to 1. This wide range allows one burner to be used where two were required before with the old type and in applications where a wide turndown was necessary.

Infiltration of cold air from the outside is eliminated in the gas furnace because the gas and inspirated air for combustion are forced in at high pressure, thus creating a pressure in the furnace which offsets the stack suction. The flues for venting the products of combustion are located near the tops of the piers and pass through the side walls into two common ducts running the full length of the furnace on each side and then across, close to the front of the furnace, to a common outlet or stack, which is closed with a gas cylinder operated damper.

When the main heating up burners are closed, naturally the positive furnace pressure is lowered and becomes negative because of the stack pull. To offset this, the damper is closed the correct amount by the forward movement of the cylinder piston. This motion is made automatic as the piston is controlled by means of the gas pressure in the main gas line and on the furnace side of the controller and control valve. Therefore, when the gas pressure is shut off this line entirely, the valve acts to close the damper.

Atmospheric control, so necessary for scale elimination, is obtained and automatically maintained by the use of venturis or gas-air proportioning devices. With these any desired atmosphere can be had, but, of course, in this case a slight excess of gas is used. Further than this, a high degree of efficiency is assured in that the mixture can be regulated for complete combustion, the gas being entirely consumed by the time it passes out of the combustion ports and into the heating chamber. The gas used is 530 B.t.u. and is delivered to the plant at from 4 to 6 in. water pressure, but this pressure is raised to 10 lb. by a reciprocating compressor.

Hot Products of Combustion Recirculated

Localization of heat, in spots or strata, has always been a factor of some concern in periodic furnaces regardless of the fuel employed. This has been entirely overcome in this new unit by means of the positive recirculation of the hot products of combustion together with the system of staggering the burners so that they fire from both above and below. Furthermore, alloy steel frames with light holes rest on the car top and the work is piled on these and in such a manner that spaces between the individual pieces are left. As the lower bank of burners fire opposite these light holes, the heat is circulated and recirculated throughout the furnace and over every square inch of the surfaces of the castings being treated. As the combustible gas-air mixture is forced through the burners under pressure, the circulation is positive, complete and continuous.

The car tops form the hearth and thus divide the furnace into two parts, the upper which is the heating chamber and the lower for the trucks to operate in. A sand seal is provided on each side and end of the car which prevents heat from leaking down through while ports in the side walls of the furnace, and below the car top, let in cold air which keeps the wheels, truck and frame cool.

Ease in Charging and Unloading

Sealing the heating chamber from the outside cold air is accomplished by fitting the doors at each end into sand seals on the floor of the car. These doors are of cast iron ribbed construction, lined with insulating concrete and are motor operated. Sheave wheels and counter weights are provided, the sheave wheels and brackets being mounted on brackets on structural steel members over the doors. The car tops are constructed of heavy steel members and lined with 5 in. of firebrick and 2½ in. of insulation. The brickwork is corbelled over to protect the steel frame of the car from the heat. The car moving mechanism consists of an air winch and an endless steel cable passing through a recess in the floor and through the center of the furnace and is suspended on a sheave at the opposite end. Chain rings are fastened to this cable and these engage hooks on the car.

When annealing castings at this plant a continuous cycle is used, and, in order to shorten the charging and discharging periods, two cars were fastened together, permanently, with a spacer bar. When the first car charge has been annealed, the furnace doors are raised and as the car is withdrawn, the other, which has been loaded in the meantime, is pulled in. The doors are then lowered and the heating up process starts up again.

This operation of charging and discharging requires less than a minute and during this time the temperature drops from 1750 to approximately 1700 deg. Fahr. Previous to this innovation, from 6 to 10 min. were necessary and with a temperature drop of 850 deg. Fahr. This hooking of the two cars together reduced the heating period materially and effected a considerable reduction in fuel consumption. An overhead monorail system with two hoists and serving both ends of this furnace makes it possible to load or unload at either or both ends.

Charging Car with Hoist and Monorail Conveyor

Some Cost Comparisons

Formerly this company used an oil-fired furnace and bought oil at 4.6c. a gallon, delivered in tank cars. Figuring the cost of unloading, operating and maintaining carrying lines and auxiliary equipment, together with oven maintenance, it arrived at the following costs:

Oil per gallon	$0.046
Unloading per gallon	.0026
Carrying lines	.0063
Low pressure air	.0200
Oil at 40 lb. pressure	.0110
Maintenance on oven	.0120
Total	$0.0979

An exhaustive report was made on the annealing situation in which were detailed all of the weaknesses of oil-fired furnaces as against the strong points of the gas-fired unit together with the fuel costs, etc., and it was this

(*Concluded on page* 692)

Indiana Harbor Merchant Mills

Two New Units in Chicago District to Have Three Open-Hearth Furnaces of 250 Tons—Full Range of Bar Sizes

TWO new merchant mills of advanced design are being completed by the Youngstown Sheet & Tube Co. at the Indiana Harbor works. Their products will include the full range of merchant bar sizes, and will overlap into the smaller structural shapes.

Two producer-gas-fired continuous furnaces, into which billets in sizes up to 7 in. square will be charged, serve the larger mill, which consists of two stands of 24-in., five stands of 18-in., and four stands of 14-in. nominal roll diameters. By an ingenious grouping of roll stands and cooling beds, it has been possible to provide two outlets of the mill, one from the last 18-in. stand and the other from the last 14-in., each delivering to its own cooling bed.

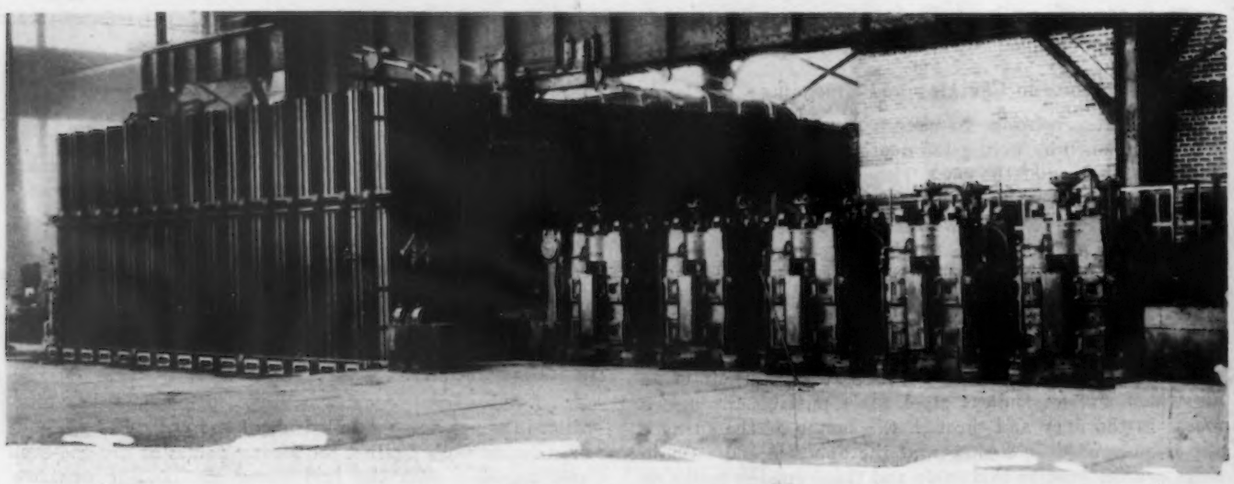
Primarily this is a 14-in. mill, but the arrangement just mentioned has widened the range of products to include sizes ordinarily covered by an 18-in. mill. The layout permits rapid changing of sections within the full range, and this is of great advantage, not only to the operators, but also to the customers, who can be served with a greater variety of products in the shortest possible time.

Smaller Mill Has 17 Stands

Served by a 30-ft. continuous furnace, taking billets from 1¾ in. to 3 in. square, the smaller mill consists of 17 stands of rolls having nominal roll diameters of 14 in., 12 in. and 10 in. Ordinarily, when rolling merchant bars, only 13 stands or less will be employed, delivering bars either to the cooling bed or to the reels. To these 13 stands four more stands can be added, thereby converting the merchant mill to a rod mill capable of rolling No. 5 rods. This combination will give the mill a range from No. 5 rods to 1-in. rounds, and other sections such as squares, hexagons, flats, etc., of equivalent weights.

All sizes of rounds, squares and hexagons can be furnished coiled, in bundles weighing from 150 lb. to 900 lb., depending on size, but only those sizes down to ¼-in. rounds will be delivered on the cooling bed. A feature of the mill is that No. 5 rods can be furnished in bundles of any desired diameter and in weights up to 450 lb.

To obtain bars of unusually fine finish an extensive hydraulic system has been provided on both mills, for the purpose of removing scale by spraying the bars while in process of rolling. There are also appliances to insure the proper predetermined finishing temperature and greatest possible accuracy of size. The cooling beds have been designed with a view of delivering exceptionally straight bars to the shears, thereby making it possible, in normal cases, to furnish a product acceptable to the customer without

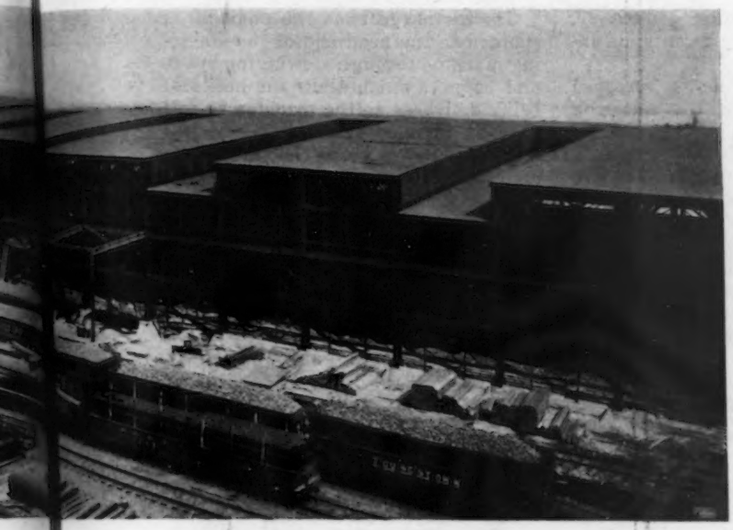


Continuous Billet-Heating Furnace and Five Stranding Roll Sets of the 10-In. Continuous Mill

additional charge for cold straightening. The cooling bed of the 10-in. mill is provided also with pack annealing arrangement for spring flats and similar products.

Maximum Daylight for Inspection

In the shipping department, which is of ample size, special effort has been made to obtain the maximum amount of light, which is of importance to make certain the proper inspection of material. In this department are also installed straightening machines, cutting-off machines, cold saws and other appliances which may be required in preparing the rolled material in any manner desired by the customer.



The plant was designed by the Morgan Construction Co., Worcester, Mass., who also built the gas producer plant, furnaces and all rolling mill machinery. The Westinghouse Electric & Mfg. Co. furnished motors and controls for the main drives, and the General Electric Co. supplied all auxiliary motors. The buildings, designed and built by the Hansell-Ellcock Co., Chicago, and the Truscon Co., Youngstown, have an over-all length of 1650 ft. and a width of 324 ft.

There are three parallel main buildings, the center one containing the billet storage at one end, and the finishing and shipping departments of the 18-in. mill at the other. In the two outside buildings are located the gas producer plant, heating furnaces, rolling mills, cooling beds, finishing and shipping departments. One building contains the 10-in. mill and the other the 14-in. mill and the 18-in. mill, except finishing department, as noted above. Total area under roof is 10 acres.

The plant is expected to produce 300,000 tons of bars a year. To provide the additional steel tonnage, open-hearth capacity is being augmented by the addition of three 250-ton furnaces to the present plant, which consists of one 250-ton and three 130-ton furnaces.

It is the intention to retain the three smaller furnaces for special steel. This arrangement, with already existing facilities for making Bessemer steel, provides adequate means for production of the many grades of steel demanded by makers of bars.

Other expansion necessitated by the building of the merchant mills are two new soaking pits, a new motor-generator set for the blooming mill motor, and a new 10-stand continuous billet mill for rolling billets in sizes from 1¾ in. to 7 in. square.

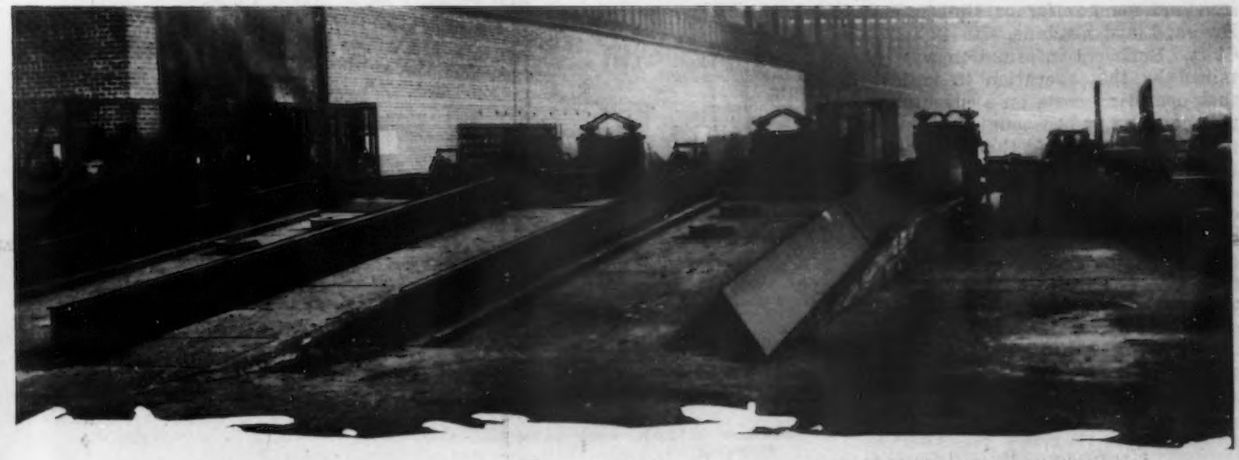
While the 10-in. mill is already in operation, it is not expected that the whole program will be completed before April.

Large Gain for Manufactured Gas Used for Heat Treating

Large-volume users of manufactured gas, furnished by Peoples Gas Light & Coke Co., Chicago, have doubled in number in the last five years, according to B. J. Mullaney, vice-president.

"The Peoples company has supplied upward of 6,000,000,000 cu. ft. of gas in 1929 for strictly industrial purposes, most of it for the heavy duty heat-treating processes of modern industry. This outlet, which has been consistently pushed for only about 10 years, now accounts for practically 15 per cent of the total output.

"In August, 1929, the company added a metallurgical and research laboratory to its facilities for promoting industrial use of gas. The purposes of this laboratory are: first, to assist customers in locating and correcting any difficulties in their heat-treating operations; second, to obtain specific information upon which to base recommendations or designs of gas-fired furnace equipment; third, to search for fundamental scientific knowledge which must be obtained to improve manufacturing processes and broaden the usefulness of gas to the community. This laboratory is second to none in the country. It is equipped to deal with every kind of heat-treating problem arising in connection with temperatures from 100 deg. up to 2900 deg. Fahr."



Finishing Stands of the 10-In. Mill. Haze, at right, beyond mill was caused by heat waves from hot bars

Sintering Limonitic Iron Ores

Commercial Application Required Reduction in Costs—Enlarged Machine Solved This Problem—Flexible Flow Sheet

BY PERRY G. HARRISON*

IT has become standard practice to treat iron blast furnace flue dust by either the Greenawalt or Dwight-Lloyd machine, so that it can be recharged into the furnace. The mining of low-grade magnetite iron deposits and their beneficiating by grinding and magnetic separation results in a fine concentrate extremely detrimental to blast furnace practice.

These concentrates are sintered and made into ideal material for blast furnace use. The application to limonitic iron ores is the most recent development of the sintering process. The first plant in the Lake Superior region was erected by the Minnesota Sintering Co., a subsidiary of the Evergreen Mining Co., at Ironton, Minn., in 1924.

The plant was designed to treat Cuyuna Range iron and manganiferous ores containing low silica, high moisture and a structure objectionable because of a large proportion of fines. Ores of this quality constitute approximately one-half of the ore reserve in the Evergreen mine.

From Experimental to Commercial

Until 1928 operations of this plant were largely in the experimental state and by reason of the drop in ore prices at about the time the plant was ready for operation and the restricted demand for ores for the next years, sufficient outlet for the plant was not obtained to demonstrate whether or not sintering had a commercial possibility. However, in 1928 this plant produced 115,000 tons of iron and manganiferous sinters on a Dwight-Lloyd machine, size 42 in. by 64 ft. Sufficient information was obtained by this operation to indicate that operating costs on a machine of this capacity, when coupled with ore prices current during that year, were prohibitive.

Satisfactory reduction in sintering costs had been obtained, however, at both Buffalo and Chateauguay by the replacement of 42-in. Dwight-Lloyd sintering machines by machines with a 72-in. hearth width. On the basis of these results, and estimated savings calculated by the operators of the Evergreen plant, the plant was rebuilt during the winter of 1928-29, with most satisfactory results, as indicated in Table I.

Ore, fuel and fine sinter screened from the discharge of the sintering machine are conveyed by the collector conveyor to an elevator and raised to the top of the sintering plant, where they are discharged into a drum-type pug mill especially designed to handle the sticky, abrasive material treated in this plant. In the pug mill, the ore, fuel, return sinter and some additional water are mixed to the consistency required by the sintering operation.

The discharge from the pug mill is spouted to the head end of the sintering machine through a swinging spout and hopper, which allow the material being delivered to the machine to fall over an inclined surface of material previously delivered, so that the coarse material may segregate out toward the bottom of the sinter bed. The moving sinter bed carries the mixture of ore, fuel and returned sinter to three ignition furnaces.

Ignition and Travel of Burning Zone

Each furnace covers the width of the bed and burns gas obtained by

Table II.—Evergreen Sinter Metallurgy During 1929

	Tons	Iron, Per Cent	Phosphorus, Per Cent	Silica, Per Cent	Manganese, Per Cent	Aluminum, Per Cent	Loss, Per Cent	Moisture, Per Cent
Iron Ore								
Crude ore to plant	249,796							
Dried		52.08	0.275	8.76	1.09	4.04	7.61	
Natural		44.95	0.233	7.42	0.92	3.42	6.44	15.32
							Gain	
Sinter shipped	192,477							
Dried		59.20	0.322	9.48	1.19	5.23	1.15	
Natural		58.89	0.320	9.43	1.18	5.20	1.14	0.50
Recovery	77.1%							
Extraction		100.9	105.8	97.9	98.8	117.2	Nil	2.5
Ratio of natural analyses		1.31	1.37	1.27	1.28	1.52		0.03

Theoretical value of crude ore (too low grade actually to sell):

44.95	@0.08738	$3.93	Mesabi Non-Bessemer	
4.55	0.08738	0.40	Penalty	
		$3.53		
		1.79	Freight	$1.74
Sinter value 58.89	@0.08738	$5.15		
		1.79	Freight	3.36
Increase in f.o.b. mine value due to sintering				$1.62

	Tons	Iron, Per Cent	Phosphorus, Per Cent	Silica, Per Cent	Manganese, Per Cent	Aluminum, Per Cent	Loss, Per Cent	Moisture, Per Cent
Manganese Ore								
Crude ore to plant	27,216							
Dried		45.81	0.342	9.69	4.13	5.02	10.84	
Natural		37.60	0.281	7.95	3.39	4.12	8.90	17.92
							Gain	
Sinter shipped	19,659							
Dried		53.08	0.435	10.83	4.74	5.64	1.10	
Natural		52.81	0.433	10.77	4.72	5.61	1.09	0.50
Recovery	72.2%							
Extraction		101.5	111.7	97.9	100.6	98.3	Nil	2.0
Ratio of natural analyses		1.40	1.54	1.35	1.39	1.36		0.03

Theoretical value of crude ore (too low grade actually to sell):

37.60				
3.39				
40.99	@0.09029	$3.70	Old Range Non-Bessemer	
		1.79	Freight	$1.91
Sinter value 52.81				
4.72				
57.53	0.09029	$5 19		
		1.79	Freight	3.40
Increase in f.o.b. mine value due to sintering				$1.49

*General manager, Evergreen Mining Co., Ironton, Minn. Abstract of paper delivered Feb. 19 before the American Institute of Mining and Metallurgical Engineers, at New York.

treating in preheating retorts oil of 38 deg. gravity. Ignition of the solid fuel in the upper portion of the bed of material takes place under these furnaces and the burning zone gradually travels downward through the bed under the influence of a downcast draft of air drawn through the bed by a Buffalo forge Co. fan, which furnishes 60,000 cu. ft. a minute and operates at from 15 to 18 in. of water vacuum.

By the time the material in the bed has traveled 76 ft. and reached the discharge end of the machine, the zone of burning and incipient fusion—*i. e.*, sintering—has burned completely through the bed. The finished sinter, ranging in size from fines to large chunks 2 ft. wide by 6 ft. long and about 1 ft. thick, drop off the bed and discharge on to a grizzly made of railroad steel set 1¼ in. apart. There any fine sinter or unsintered ore drops through into the bin for return sinter and the coarse material is spouted into railroad cars, which are protected from the red hot material by water sprays arranged to cool the part of the material close to the sides of the car.

Table I.—Operating Results at Evergreen Plant

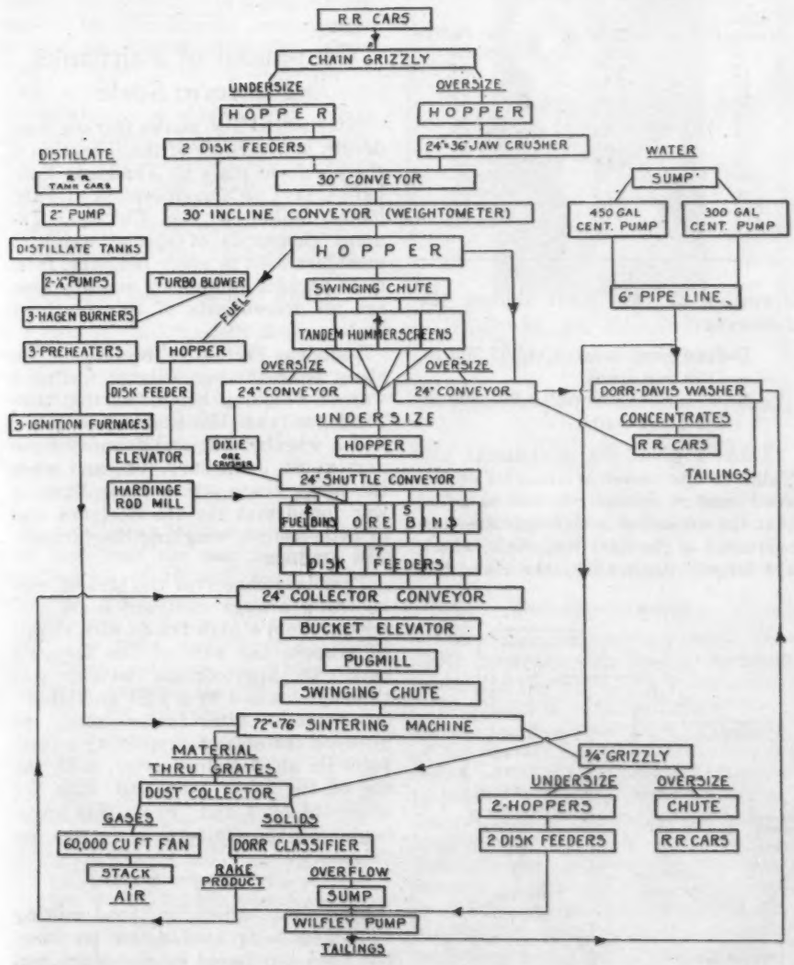
SINTER PRODUCTION RATE

Year	Tonnage	Actual Hours Operated	Tons per Actual Hour Operated	Effective Grate Area, Square Feet	Tons in 24 Hours per Square Foot Grate Area
1926.....	15,784	921	17.14	224	1.84
1927.....	19,794	1,038	19.07	224	2.04
1928.....	115,546	5,054	22.86	224	2.45
1929.....	213,022	4,826	44.14	452	2.34

POWER COST AND LABOR EFFICIENCY COMPARISONS

		Per Ton Sinter	Tons Sinter per Man-Shift
1928	42 in. by 64 ft. sintering machine.....	$0.2179	11.86
1929	72 in. by 76 ft. sintering machine.....	0.1443	16.77

The flow sheet of the plant is extremely flexible. Ore delivered to the plant can be treated as follows: (1) It can be simply crushed and reloaded into railroad cars; (2) it can be crushed and the fines screened out and sintered while the coarse is loaded for shipment direct, or washed and the coarse material, reduced in silica and moisture, can be shipped; (3) the entire ore can be crushed and washed; (4) the entire ore can be crushed to pass ⅜-in. mesh and sintered. This wide flexibility makes possible the beneficiation of greatly varying types of ore.



Flow Sheet, Evergreen Plant

Metallurgical Results in 1929

The metallurgical results obtained on ore put through the sintering process during 1929 are shown in Table II.

Sinter as produced by the Evergreen Mining Co. is very coarse, but it is subjected to a drop of about 60 ft. in loading from dock to boat, which breaks down the large lumps and leaves a firm, rugged product which will not break down further under load, although it still retains a cellular and porous structure, which, like coke, permits the free and uniform distribution and passage of furnace gases, with consequent good reducibility and freedom from hangs and slips in the blast furnace.

Although both cellular and porous, Evergreen sinter, being vitreous, will not absorb water and therefore will not freeze in stock pile. An interesting example of this was the loading, in subzero weather, of the last boat to leave the head of the lakes with sinter this year, in less than three hours.

Cost of Sintering Iron Ore

As compared to washing, or washing and jigging, of iron ores, the sintering process is expensive. The application of the process to limonitic iron ores by the Evergreen Mining Co. is too new to establish a cost structure which can be expected to be permanent. This is evidenced by the fact that the cost of sintering was cut 41c. a ton by improvements to plant, capacity and methods from 1928 operations to 1929.

As extensive a program of plant improvement and enlargement is scheduled for the current winter as was put through the last winter, including lengthening the sinter machine to 127 ft., which will result in 762 sq. ft. of grate area, or a machine one-third larger than the largest 96-ft. sintering machines now being erected by the Bethlehem Steel Corporation.

Despite all accomplished and hoped for cost reductions, the process is likely to have its application confined to ores which, by reason of structure or analysis, are difficultly merchantable in their natural state and which are unsuitable to water concentration

because the fines are high in iron. Effective beneficiation of iron ores by the washing process can be accomplished only with ores in which the fines, being the bulk of the material removed, are high in silica and low in iron. The field for sintering, however, remains fairly large, particularly applied to ores under the disability of double unit penalties or on which freight costs per unit of metallic material are high.

Reduction of the Burden in the Shaft

DISCUSSION on this paper included a suggestion by T. L. Joseph of the United States Bureau of Mines that the use of sinter in the charge of a blast furnace produces a change in volume within the furnace, because of the porosity of the sinter. This makes a material change in the size of the ore charge.

There has been a careful study made, Mr. Joseph said, within the past few years, for the purpose of improving the operation of the upper 70 per cent in the height of a blast furnace. He reported that observations in a blast furnace in Utah showed that 96 per cent of the ore had already been reduced by the time the burden reached the top of the bosh. A similar determination in a blast furnace in Alabama showed that only 80 per cent of the ore had been reduced at this point. A furnace in the Chicago district, operating on Lake Superior ore, was found to have reduced only 25 per cent of the ore at the top of the bosh.

Reclaiming Steel Foundry Sands*

Recovery of 85 Per Cent, at Much Lower Cost Than New Sand and of High Uniformity

AFTER trying out, on a small scale, several types of reclaiming apparatus, it was found that the combination of a muller-type sand mill and an air classifier followed by a dust collector gave the best results.

Results from an experimental unit indicated that a recovery of more than 70 per cent could be attained and that the reclaiming of refuse sand should prove highly profitable. On the basis of these tests a full-size unit was designed and installed. The schematic diagram shown should give a clear idea of the type of apparatus used and method of operation.

There are, of course, details which contribute to the successful operation of the plant, but which have not been shown because they would complicate the diagram and are not necessary for an understanding of the principles involved. A typical week's operation of this plant showed the following:

Refuse sand treated, 1,177,700 lb. (100 per cent)
Good sand recovered, 1,005,800 lb. (85.4 per cent)

Table I gives the mechanical and Table II the chemical analysis of the good sand recovered. It will be noted that the undesirable elements are concentrated in the finer materials, which are largely removed by the classifier, leaving only the small percentages shown in the good sand.

Operation of this plant for several years has proved that refuse sand can be reclaimed at a fraction of the cost of new sand. Furthermore, castings poured into molds made of reclaimed sand mixtures are equal in every respect to those poured into molds made of sand mixtures containing all or part new sand. In fact, sand reclaimed in this manner is much more uniform in quality than any ordinary grade of new molding sand. This uniformity, together with the fact that it is free from moisture, makes it an ideal sand for use in the production shop where close control of the sand quality is imperative.

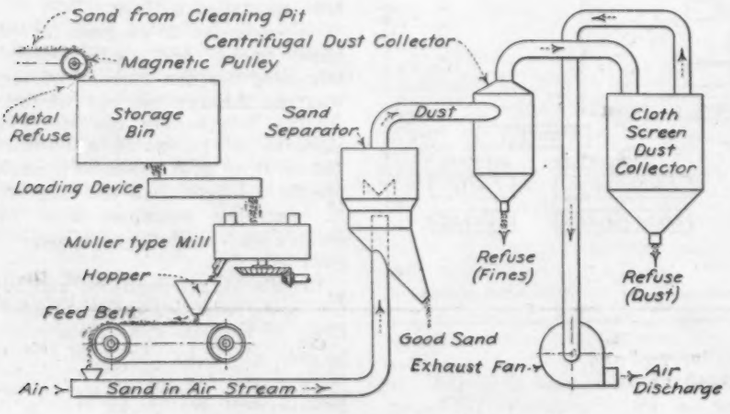
Table I—Mechanical Analysis of Reclaimed Sand

Sieve Number	Per Cent Retained	Cumulative
8	None	None
12	0.27	0.27
14	0.91	1.18
20	1.60	2.78
28	10.65	13.43
40	51.82	65.25
48	26.61	91.86
70	6.66	98.52
100	0.79	99.31
140	0.24	99.55
200	0.06	99.61
—200	0.10	99.71

Table II—Chemical Analysis of Fractions of Reclaimed Sand Retained on Screens

	Per Cent					
	48 Mesh	70 Mesh	100 Mesh	140 Mesh	200 Mesh	—200 Mesh
Water	0.40	0.38	0.60	0.74	1.04	1.81
Carbon	0.66	0.90	1.50	1.74	2.70	4.00
SiO_2	97.46	95.38	91.60	90.74	86.46	80.14
Al_2O_3	1.18	2.47	3.43	4.12	6.85	10.29
Fe_2O_3	0.10	0.06	0.69	0.61	0.74	0.71
FeO	0.36	0.52	1.48	2.05	2.33	3.12
CaO	Trace	Trace	Trace	Trace	Trace	Trace
MgO	Trace	Trace	Trace	Trace	Trace	Trace
K_2O	Not determined					
Na_2O	Not determined					
Total	99.96	99.71	99.30	100.00	100.12	100.07

*From a paper presented Feb. 19, at the annual meeting in New York, of the American Institute of Mining and Metallurgical Engineers, by A. H. Dierker, research engineer, Ohio State University, Columbus.



Schematic Diagram of Sand-Reclaiming Plant

Centennial of Fairbanks Platform Scale

Nineteen thirty marks the one hundredth anniversary of the invention of the platform scale by Thaddeus Fairbanks, says an announcement of Fairbanks, Morse & Co., Chicago. The many thousands of special weighing machines used in every industry, from meat packing to aircraft manufacture, are all descendants of this platform scale.

Thaddeus Fairbanks' invention came about from the necessity of finding a way of weighing hemp. At that time Thaddeus and his brother, Erastus, had a wheelwright and foundry business at St. Johnsbury, Vt., and when the hemp craze struck their State it was found that the old steelyard was of little use for weighing the farmers' new product.

Thaddeus conceived the idea of constructing a huge steelyard beam suspended from a high frame with chains to grapple the axle of the farmer's cart. An approximate weight was thereby obtained by a slow and laborious process. After further study, he hit upon the idea of supporting a platform on an A-shaped lever, with the tip of the lever connected with the steelyard by a rod. From this small beginning the platform scale was developed.

The first American road-making equipment to be used in that territory has been purchased by the Municipal Authorities of Mukden, Manchuria, according to a report from Consul M. S. Myers, made public by the Department of Commerce.

Mining Engineers Meet in New York

Metallurgists Honored with Medals—Large Attendance Hears Papers on Steel and Non-Ferrous Metals —Two Notable Lectures

WITH a registration of over 1400, the American Institute of Mining and Metallurgical Engineers held last week, Feb. 17 to 20, one of its most successful and largest conventions. It was the annual February meeting and the 139th general session; it met, as usual, at the Engineering Societies Building in New York.

Both the iron and steel and the Institute of Metals divisions of the institute held notable sessions. At the three sessions of the steel division 13 papers on miscellaneous topics were presented, and at the five sessions of the non-ferrous division 22 papers were listed. Abstracts of and comments on some of the steel and non-ferrous papers will be found in this and subsequent issues of THE IRON AGE.

Medals Awarded and New Officers Elected

AT the annual business session of the institute on Tuesday, Feb. 18, announcement was made of the election of officers and directors for the coming year. They are given elsewhere. In its new president, W. H. Bassett, the institute has a man widely known in non-ferrous metallurgy. In 1925 he was awarded the James Douglas medal of the institute.

As usual, at the annual banquet, the awarding of medals and prizes was the feature. The attendance was over 1000 and the dinner was followed by dancing. The affair compared favorably with the famous Hoover banquet in 1928, when President Hoover received the Saunders medal.

Message from President Hoover

A letter from President Hoover was read at the banquet. He congratulated the institute on its growth and wished it continued success. President Hoover is one of the past-presidents of the Institute.

New Members of Legion of Honor

In compliance with a custom initiated last year the new members of the "Legion of Honor" were read—men who have been members of the institute for 50 years. The "class of 1880" this year consists of 11 men now living, only one of whom was able to be present, George E. Thackray. The list follows:

A. W. Crookston, mining engineer, London, England; W. B. Devereaux, consulting mining engineer, New York; B. F. Fackenthal, Jr., Reigelsville, Pa.; Frank Klepetko, mining and metallurgical engineer, Lima, Peru; Wheaton B. Kunhardt, chairman board of directors, Carpenter Steel Co., Reading, Pa.; William L. Neill, Syracuse, N. Y.; Francis Nicholson, consulting mining engineer, London, England; William N. Page, civil and mining engineer, Washington; Arthur W. Shaefer, mining engineer, Pottsville, Pa.; George C. Stone, chief metallurgist, New Jersey Zinc Co., New York, and George E. Thackray, special engineer, Bethlehem Steel Co., Bethlehem, Pa.

W. H. Bassett
Institute's New President

The names of the 29 members of the legion, as founded last year, were published in THE IRON AGE, Feb. 28, 1929. The legion now numbers 40.

Douglas Medalist

Two important medals were formally awarded—the James Douglas medal and the Robert W. Hunt medal.

The Douglas medalist for 1930 was John Van Nostrand Dorr, President of the Dorr Co., New York. Established in 1922 by anonymous donors to commemorate the life work of Dr. James Douglas, engineer and metallurgist, the medal is bestowed for distinguished achievement in non-ferrous metallurgy. Mr. Dorr has contributed to the mining and metallurgical industries two pieces of equipment in general use in modern hydrometallurgical and ore-dressing plants. One is the Dorr classifier and the other the Dorr continuous thickener. Last year this medal was awarded to Dr. Paul D. Merica, International Nickel Co., New York.

Wrought Iron Process Inventor is Hunt Medalist

The Hunt medalist for 1930 was James Aston, professor of mining and metallurgy, Carnegie Institute of Technology, Pittsburgh. Founded by employees and partners of Robert W. Hunt & Co., Chicago, in commemoration of the life work of the distinguished engineer and metallurgist who founded the company, the award is made each year on the advice of a committee of the iron and steel division for the best original paper or papers on iron and steel. Mr. Aston was given the award for his paper, "A New Development in Wrought Iron Manufacture." The Hunt medalist last year was Edgar C. Bain, research laboratory, United States Steel Corporation, Kearny, N. J.

The Johnson Award

The J. E. Johnson, Jr., award for this year was presented to William S. Unger, superintendent, Carrie furnaces, Carnegie Steel Co., Pittsburgh. The fund from which this award is made was established in 1921 to encourage young men in lines of research, particularly blast furnace metallurgy, in memory of Mr. Johnson, whose major contributions were in this field. The prize is cash and was bestowed on Mr. Unger for his record in various positions he has held in operating large blast furnace plants. The last award in 1928 went to P. H. Royster.

Officers of the Divisions

At the annual meeting of the iron and steel institute division the following officers were elected:

Chairman, W. J. MacKenzie, vice-president, Interstate Iron & Steel Co., Chicago; vice-chairman, C. S. Robinson, second vice-president, Youngstown Sheet & Tube

Co., Youngstown; J. T. MacKenzie, chief chemist, American Cast Iron Pipe Co., Birmingham; C. E. Meissner, sales engineer, Chrome Steel Works, Chrome, N. J.; executive committee (3 yrs.), A. L. Feild, Simonds Mfg. Co., Lockport, N. Y.; R. F. Harrington, chemist and metallurgist, Hunt-Spiller Mfg. Corporation, Boston, and E. F. Kenney, metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa.

At the annual dinner of the Institute of Metals division, held at the Savoy-Plaza Hotel, Thursday evening, Feb. 20, the following officers for the ensuing year were elected: Chairman, Dr. Zay Jeffries; vice-chairmen, John R. Freeman, Jr., physicist, division of metallurgy, U. S. Bureau of Standards, Washington, and Sam Tour, vice-president, Lucius Pitkin, Inc., New York.

A feature of the dinner was an illustrated address by G. H. Clamer, Ajax Metal Co., Philadelphia, on the development of the Ajax-Wyatt and the high-frequency furnaces.

Committee meetings of two large technical societies were held during the week. One of the most important was that of the joint research committee on the effect of temperature in the properties of metals of the American Society for Testing Materials and the American Society of Mechanical Engineers.

This committee has recently been completely reorganized with H. J. French, International Nickel Co., New York, as chairman, and N. L. Mochel, metallurgical engineer, Westinghouse Electric & Mfg. Co., Philadelphia, as secretary. An all-day meting was held at which a program for future work was thoroughly discussed and planned with many subcommittees organized. Prospects are bright for some valuable and important results from the work of this committee.

Other committees which met were B-3 and B-4 of the A. S. T. M. and one or two of the American Foundrymen's Association.

Howe and Institute of Metals Lectures

OF the two special addresses that featured the meeting, the Howe memorial lecture was delivered by Dr. Zay Jeffries, consulting metallurgist, Cleveland, and the institute of metals lecturer was Dr. S. L. Hoyt, research metallurgist, General Electric Co., Schenectady, N. Y. Next year a foreign scientist will be elected for this lecture, the foreign and American alternating each year. Last year Ulic R. Evans, British metallurgist, gave the address.

Future of American Steel Industry

Taking as his subject "The Future of the American Iron and Steel Industry," Dr. Jeffries presented on Thursday afternoon, Feb. 20, a few historical facts and then discussed the future possibilities, giving poetic license to imagination. Some of the revolutionary developments which may affect the iron and steel industry were effectively outlined. Dr. Jeffries said that it can be stated with certainty that there is ample iron in the earth's crust for all possible future needs. Research and development in the industry should keep pace with similar activities in other industries and it should be aggressive. There are in sight no factors outside the iron and steel industry which seriously threaten its future growth. A liberal abstract of the lecture will be published next week.

Dr. Hoyt on Tungsten Carbides

"HARD Metal Carbides and Cemented Tungsten Carbide" was the title of the institute of metals lecture given by Dr. S. L. Hoyt, research laboratory, General Electric Co., Schenectady, N. Y., on Feb. 19. In it he correlated the work done in America with that done abroad—chiefly in Germany—on the industrial application of these carbides in the form of metal cutting tools.

The literature is not extensive, despite the early electric furnace work which discovered the existence of calcium carbide and many carbides in groups four, five and six of the periodic sequence, headed by titanium, vanadium and chromium, respectively. The carbides of the iron-cobalt-nickel group are similar in being hard and brittle, and the iron carbide is an essential constituent of steels and cast irons, but the discovery that the tungsten carbides W_2C and WC could be prepared and utilized for metal cutting, despite their great inherent brittleness, bids fair to have profound influence on machine shop practice.

Dr. Hoyt regretted that he has no rapid test for hardness at the extremes represented by hard metal carbides. From a mineralogical standpoint they are in the same class as topaz and sapphire. On the scale of "absolute" hardness, wherein quartz is 57 and diamond 225, tungsten carbide is about 120. Even this is less than that of boron carbide, which is used as a lapping substance in sharpening the tools.

Manufacture of Tools by "Cold Press"

The art of manufacturing the tools is so young that changes are to be expected from time to time. Already two distinct methods have been evolved: the "cold press" and the "hot press." The former is the one used for most of the tools now in service and starts with powered tungsten oxide, which is reduced to metal by hydrogen by the same methods used in the incandescent lamp industry. The metallic powder is then mixed with a proper quantity of fine carbon and heated about three hours at 1500 deg. C. Chemical reaction is practically complete and the grain size of the carbide is under control at these temperatures; Dr. Hoyt can not say the same for the product if it is heated high enough to melt. Cobalt powder (also produced by hydrogen reduction) is then added to the fine carbide and mixed in a ball mill. The pounding of the steel balls causes a certain amount of agglomeration in the ductile cobalt, and appears to smear it over the surface of the carbide particles (a conclusion supported by a study of the magnetic properties).

Next, the ball mill product is squeezed into the desired shape in proper dies under a hydraulic press. To give these little briquettes the necessary strength for handling they are baked for 30 min. at about 800 deg. C. and finally are sintered in an electric furnace at a much higher temperature.

Mechanism of the Sintering Operation

Owing to the fact that the tungsten-cobalt-carbon equilibrium diagram is unknown, the mechanism of the sintering operation can only be conjectured from the following observations: (a) Full hardness and strength in the completed tool is attained after sintering at 1400 deg. C. (well below the melting point). (b) A temperature *above* 1300 deg. C. is required. (c) Thermal analysis of a completed tool shows a slight absorption of heat at 1350 to 1360 deg. C., and a corresponding evolution at the same temperature in cooling (characteristic of melting and freezing respectively). (d) The completed tools have fewer fine particles of carbide than exist in the mixture before sintering. (e) The microscopic appear-

Officers of American Institute of Mining and Metallurgical Engineers

President:

William H. Bassett, technical superintendent, American Brass Co., Waterbury, Conn.

Vice-presidents:

Scott Turner, director United States Bureau of Mines, Washington.

Henry Krumb, mining engineer, Salt Lake City, Utah.

Directors:

R. C. Allen, vice-president, Oglebay, Norton & Co., Cleveland.

Cadwallader Evans, Jr., general manager, Hudson Coal Co., Scranton, Pa.

John M. Lovejoy, Amerada Petroleum Co., Tulsa, Okla.

John A. Mathews, vice-president, Crucible Steel Co. of America, New York

Milnor Roberts, dean, college of mines, University of Washington, Seattle, Wash.

Zay Jeffries | S. L. Hoyt | J. V. N. Dorr | James Aston | W. J. MacKenzie

Drs. Jeffries and Hoyt Were the Two Annual Lecturers. Messrs. Dorr and Aston were the Douglas and Hunt medalists respectively. Mr. MacKenzie is the new chairman of the iron and steel division with Dr. Jeffries the new head of the institute of metals division

ance of the sintered tool shows angular grains of carbide, with surprisingly well developed crystal surfaces, arranged helter-skelter in "kaleidoscopic" manner, in a cement of cobalt metal. No third phase has yet been discovered. (f) The electrical and magnetic properties of the tools (that is, of the continuous phase, the cobalt cement) are much more like those of pure cobalt than like pure tungsten carbide.

From these facts the sintering process is thought by Dr. Hoyt to be as follows: Metallic cobalt unites with the very finest of the carbide particles in the ground mixture to form a molten eutectic as the temperature passes 1350 deg. C. This liquid wets the surface of the larger carbide particles and forms a good bond, but since the remaining cobalt is saturated easily, it is inert to the bigger carbide particles at the temperature encountered. On subsequent cooling the carbide in the eutectic is absorbed or obscured by the adjoining large particles of carbide.

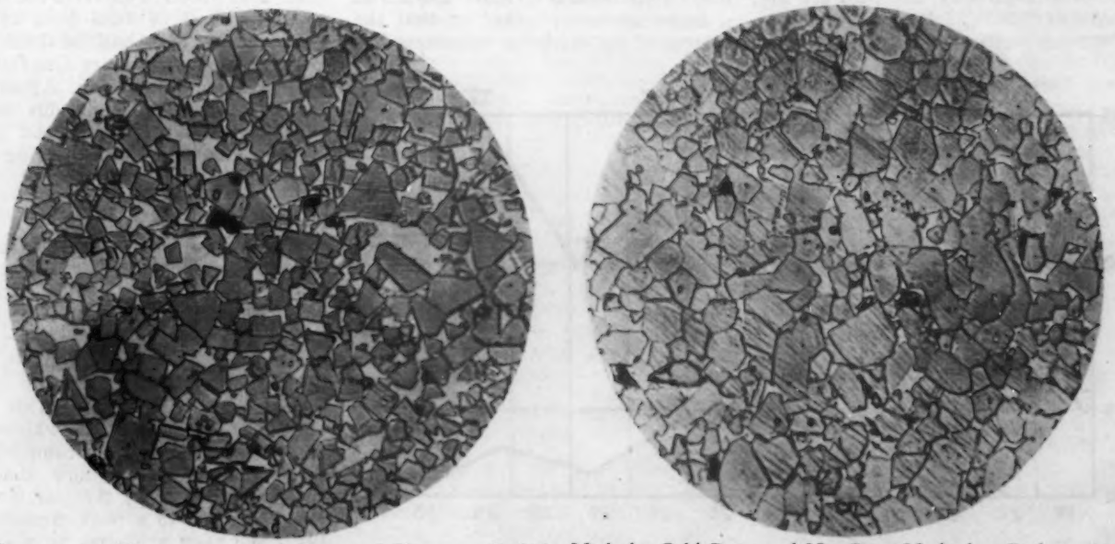
Such a hypothesis is not incompatible with other observations made by Dr. Hoyt, and discussed in detail, such as the presence of many tiny cavities in cold pressed tools, the occasional "migration" of cobalt to the surface of the tool during sintering, and the properties of mixtures containing low or high percentages of cobalt (3 and 20 per cent respectively).

Manufacture of Tools by "Hot Press" Method

In order to eliminate the microscopic voids existing throughout the structure, a "hot press" method of manufacture has been devised. In this the particles are heated while being pressed in a mold under constantly increasing pressure up to many tons per square inch. Such shrinkage as is responsible for voids in later sintering is thus forced by the higher pressure. Hot pressing not only reduces the time of subsequent sintering but has eliminated the necessity of some previous steps in the manufacture. The most recent process may therefore be outlined as follows: powdered tungsten, cobalt and carbon in proper proportions are ground in a ball mill, pressed in a graphite mold, and heated by the passage of heavy electric currents while the pressure is being applied. Temperature of the charge is watched by optical pyrometers through peep holes in the mold, and when pressure, temperature and time are correct, the result is a fine grained agglomeration of closely packed carbide particles, free from voids. Even with a lower amount of cobalt, the physical properties of these hot pressed tools seem to be definitely superior to those made by cold pressing and sintering.

Data on Physical Properties

Much study has been given to the physical properties of cemented tungsten carbide, especially in relation to those of hardened high speed steel. Among the comparative data given by Dr. Hoyt, the following may be quoted. (All material contains 13



Comparative Microstructures of Cemented Tungsten Carbide Made by Cold Press and Hot Press Methods. Both sections etched and photographed at 2500 diameters, reduced one-half in reproduction. Cold press tool has 13 per cent cobalt; note the kaleidoscopic arrangement of carbide grains with plane faces. Hot press tool has 7 per cent cobalt; note the more compact arrangement of less sharply developed grains

per cent cobalt unless otherwise noted.)

Transverse Strength (Modulus of Rupture) at Room Temperatures.
- Carbon tool steel—500,000 lb. per sq. in.
- High speed steel—425,000 lb. per sq. in.
- Cemented tungsten carbide—225,000 to 275,000 lb. per sq. in.
- Same, quenched from 1000 deg. C.—below 100,000 lb. per sq. in.

Transverse Strength of Tools at Moderately Elevated Temperatures.
- Room temperature—about 225,000 lb. per sq. in.
- 800 deg. C.—183,000 lb. per sq. in.
- 850 deg. C.—170,000 lb. per sq. in.
- 900 deg. C.—141,000 lb. per sq. in.

Modulus of Elasticity (From Vibrating Bar)
- Cemented tungsten carbide—79,000,000 lb. per sq. in.
- Tungsten—60,000,000 lb. per sq. in.
- Steel—30,000,000 lb. per sq. in.

Torsional Modulus.
- Cemented tungsten carbide—17,250,000 lb. per sq. in.
- High speed steel—8,150,000 lb. per sq. in.
- Compressive strength—540,000 lb. per sq. in.

Cutting Efficiency (Bureau of Standards' Tests).
- Test log: annealed 3½-per cent nickel steel forging.
  - Ultimate strength—90,000 to 100,000 lb. per sq. in.
  - Tool: Carboloy Co. standard ½ x 1 in. general purpose tool for steel.
  - Depth of cut—$\frac{1}{8}$ in.
  - Feed—0.031 in.
  - Breakdown: when tool chips and glazes test log.
  - Relation between cutting speed (V) and tool life (T minutes) is $VT^{\frac{1}{8}}=260$.
    - Speed for failure in 1 min.=260 ft. per min.
    - Speed for failure in 20 min.=140 ft. per min.
    - Speed for failure in 30 min.=129 ft. per min.
    - Speed for failure in 40 min.=122 ft. per min.

Business Reaction Not Yet Completed

ON Jan. 16, 1930, Alvan T. Simonds, president of the Simonds Saw & Steel Co., Fitchburg, Mass., received through the mail a clipping from a newspaper of Jan. 16, 1929, which quoted him as predicting a slump in business late in 1929 because of high money rates.

In commenting on the forecast in the March issue of *Looking Ahead*, Mr. Simonds says that he had merely stated what would happen if the correlation between money rates reversed and industrial production continued during 1929 and 1930.

"It must be remembered," Mr. Simonds declares, "that these forecasts are for major movements. A study of the chart will show that the length of each movement has also been approximately forecast in each case. The forecast for 1929 and 1930 was for a declining movement in the volume of industrial production beginning some time in the first half of 1929 and extending to the middle or the end of 1930. On the chart this declining movement is shown by the heavy solid line down from May, 1929, toward the middle of 1930.

"At this writing (Feb. 15) the regular spring rise has begun and will probably continue for six weeks or longer. It is uncertain how high this peak will go but it is practically certain that it will not go so high as the peak in 1929. Many comments reach us at such a time as this pointing out that the forecast is incorrect because business is improving instead of declining. Very many came to us in 1924, the peak in the spring of that year being almost as high as the peak in 1923. Again in 1927, there was a decided rise in the spring. Yet in both these cases the forecast of declining trend was correct and bottoms were reached in the middle of 1924 and at the end of 1927. When the spring rise in a major declining movement is in evidence, such comments as the following from a leading daily, Feb. 14, 1930, appear in the financial columns: 'The impression is growing that the worst of the business recession is over. The debatable question at the moment is how rapid the recovery will be.'

"This is not incorrect but it misleads many into the belief that from now on business is to move upward in a major movement, that is, that the bottom of the declining movement has been reached in February, 1930. Of course, this may be possible, but it is not at all likely. The forecast shows that the low point in the second half of the year will be lower than the low point in January or February, with the spring rise between the two.

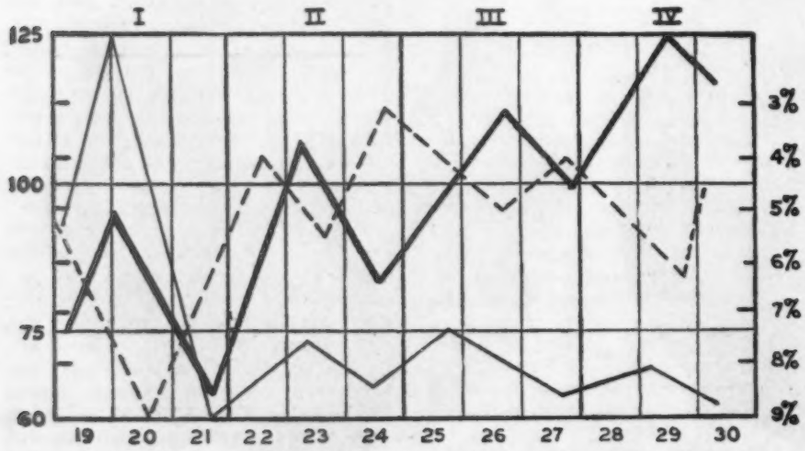
Relation of Prices to Money Rates

"Notice upon the chart the light solid line which shows movements in wholesale commodity prices. It is clearly evident that since the war each major movement of increasing money rates has been followed some months later by a decreasing movement in wholesale prices, and each major movement of decreasing money rates has been followed some months later by a corresponding movement of increasing prices. Money rates have sharply declined since November, 1929. This decline will be followed by rising prices, probably beginning in 1930.

"Decreasing money rates, if continued in a major movement, are followed by increasing production and rising prices. Such is the major movement next ahead of us, from the middle or latter half of 1930 to a cyclical peak in the first half of 1932. Decreasing money rates are also followed by increasing speculation. Apparently this has already begun, due to the general realization that good stocks are now a bargain and will bring much higher prices in a year or two.

Next Peak in 1932

"Increasing production and increasing speculation first slow up decreasing money rates and finally turn the trend to increasing rates. This takes time. If increasing money rates then continue in a major movement, production will finally turn down into a recession or a depression. This completes the industrial cycle, which since 1919 has regularly been completed in three years. We are now about to enter the fifth since the war, from a valley in 1930 to a peak, probably in 1932, and then a decline to a valley, probably in 1933—if this cycle patterns after the four we have passed through since the war."



THE Heavy Solid Line Is the Volume of Industrial Production, With 100 Representing the Daily Average Output During 1923, 1924 and 1925. The chart shows only major movements. The dotted line shows commercial paper rates at New York. The light solid line represents wholesale commodity prices.

Plan to Push Pacific Coast Plants

With Region's Production Equivalent to Only One-Sixth of Needs, Statements of Policy Feature California Conference of Steel and Allied Industries

INCLUDED among the important features of the sixth annual conference of the Iron, Steel and Allied Industries of California at Del Monte, Feb. 13, 14 and 15, were the opening address of J. E. Webster, chairman of the conference, the adoption of important resolutions to extend further the work and activities of the organization and addresses by A. T. DeForest, vice-president, United States Steel Products Co., Columbia Department, San Francisco, and Charles F. Abbott, executive director of the American Institute of Steel Construction, New York.

Attendance was unusually large, more than 200 leading executives connected with the steel industry were present. The program differed from those of former years in that all meetings were held in the mornings, the afternoons being set aside for golf and other forms of recreation. Another important feature was the arrangement of group meetings for steel mills, foundries, merchant bar jobbers, structural steel fabricators, manufacturers, reinforcing steel bar jobbers, purchasing agents and traffic men. In former years these group meetings were held in the afternoons. This year the groups met in different rooms for dinner, following which discussions of problems pertinent to each individual group took place.

Iron and Steel One-Fifth of All California Industry

J. E. Webster, chairman of the conference and general manager of Ducommun Corporation, Los Angeles, in his opening remarks said, "Industry is rapidly forging ahead on the Pacific Coast, and California is leading this sound industrial expansion. The iron and steel industry is basic to this development, representing approximately 20 per cent of the industrial structure of the State. It therefore behooves us to see that the iron and steel industry keeps its house in order and maintains its proper position in the front ranks of industrial progress, thus making its rightful contribution to a balanced prosperity in California.

"It is evident, from the experiences and accomplishments made possible through the cooperative effort initiated at our Del Monte conferences, that many of the problems of our industry which we thought were impossible of solution may be successfully worked out, on a basis of constructive cooperative effort."

Cooperating to Improve Conditions

He outlined the results obtained during the past year and stated that 40 foundries in California had adopted the standard method of painting patterns as recommended by the American Foundrymen's Association and the standard specifications for castings of the American Society for Testing Materials. Other accomplishments included the work of the traffic committee, which gave consideration to 50 rate items, on which items nine specific applications of protest were filed in the interests of California industries, favorable action being taken on six of them.

Mr. Webster recommended for adoption five major objectives during the coming year, and summarized them as follows:

1. To further the present program of simplied practice and elimination of waste as recommended by the United States Department of Commerce.
2. To foster extension of trade territory in the Western States.
3. To promote greater consideration for domestic products in California.
4. To recommend the application of the principles of Federal Trade practice to the various groups of the industry, for the purpose of assisting in better self-government within the different groups.
5. Closer cooperation between the technical groups—architects, engineers and contractors—and public and private construction interests.

The first speaker on the program was William Simpson, president of the Simpson Construction Co., Los Angeles. He outlined the development of the construction industry in southern California and emphasized the necessity of establishing a building code for Los Angeles County, which is surrounded partly by the City of Los Angeles.

One-Sixth of Steel Needs Produced on Coast

Speaking of the consumption of iron and steel products on the Pacific Coast, Mr. Simpson estimated the total at 2,500,000 net tons, of which only about 400,000 tons is now produced on the Coast. He said, "The Pacific Coast market is divided roughly as follows: Bars and rods, 450,000 tons, of which probably 60 per cent is of local origin; tin plate, 425,000 tons, 10 per cent of which is locally made; structural steel, 225,000 tons, only 20 per cent of which is made locally; sheets, 175,000 tons, 30 per cent locally rolled." He further stated that 200,000 gross tons of rails, 175,000 tons of plates, 400,000 tons of pipe, including seamless tubes, and between 300,000 and 400,000 tons of steel products of a miscellaneous classification are annually consumed, none of which is produced on the Pacific Coast. [The foregoing figures check precisely with those given in THE IRON AGE of Nov. 7, 1929, page 1244.]

Following Mr. Simpson's talk, an address on "The Relation of the Power Industry to the Development of the Iron and Steel Industry in California" was delivered by Will H. Fischer, assistant to the president, Southern California Edison Co., Los Angeles.

Savings Through Simplified Practice

The third speaker on the program was Charles M. Gunn, president, Gunn, Carle & Co., San Francisco. In speaking on "Simplified Practice and Its Application to the Iron and Steel Industry of California," he said, "Reports from the Department of Commerce show that simplified practice has produced benefits and savings in excess of $300,000,000 annually.

"As a result of the sincere interest and good work carried out by our iron and steel conferences each year, the California State Chamber of Commerce accepted, in October, 1929, the appointment to represent the United States Department of Commerce on all simplified practice work in California. A statewide committee has been appointed and at sectional meetings, in both the southern and the northern part of California, definite objectives on simplified practice for 1930 have been set up by eleven business and industrial groups, including five groups directly connected with the iron and steel industry."

An address on "California's Industrial Progress" was delivered by Frederick J. Koster, president, California Barrel Co., San Francisco. The speaker, who is vice-president of the California State Chamber of Commerce, said, "We are on the right track and we have established a solid foundation upon which to build our iron and steel structure in California.

The construction program definitely in prospect for California during the coming year is already far ahead of that for 1929."

Trade Rules Will Prevent Litigation

"Challenging the practical utility of trade bodies, the Federal Government has now come to industrial organizations and has asked us to prove our ability to govern ourselves," said Charles F. Abbott, executive director of the American Institute of Steel Construction, in an address before the sixth annual conference of the Iron, Steel and Allied Industries of California at Del Monte, Feb. 14. "Today less than a hundred of the industries of the United States have adopted trade practice codes under the supervision of the Federal Trade Commission, but I prophesy that it will not be long before most of the 2000 national trade bodies follow our example. They will take this step, not merely because it will prove of real benefit to the individual members, but because public opinion will force them to.

"The structural steel companies have already voted a group of rules which are designed to eliminate unfair and uneconomic practices within the industry. Their approval is awaiting the action of the Trade Commission. The most drastic and the most far-reaching of those rules will fall into what is known as Group 1. They are rules which will be enforceable under the Federal law regardless of the approval of the individual companies engaged in the industry. Rules which are aimed at uneconomic practices will fall in Group 2, and these will be applicable only when agreed to individually.

Plan for Application of Rules to Be Set Up

"The situation, as I see it, amounts to just this. The American Institute of Steel Constuction has been requested to set up a plan for the voluntary application of these rules. That will be done on behalf of our membership and those companies desiring to participate in the program. Companies not taking advantage of this program will have to prosecute their cases and be prosecuted before the Federal Trade Commission; our members will have an opportunity to settle their cases at arbitration and without the expense of litigation."

Robert Sibley, executive manager, Alumni Association, University of California, spoke on "The Spirit of a Business Association" and traced the early developments of the electrical industry in the West.

Plea for Fair Policy in Selling Practices

POSSIBLY the most important message delivered this year to the delegates at the conference was the address of A. T. DeForest, head of the Steel Corporation on the Pacific Coast, and the last speaker on the program. Mr. DeForest's address was of special interest in that it was the first public statement issued since the United States Steel Corporation took over the properties of the Columbia Steel Corporation on Feb. 1.

He said, "The presence of a large number, representing as they do the varied trades and industries of the State of California, is indicative of an interest, also an expression of belief in the worthiness of the accomplishments of the California State Chamber of Commerce. And the display of cordiality among those attending evidences a desire for cooperation in the iron and steel industries. Such a desire is most commendable, and experience has taught us that orderly, constructive work is both educating and essential toward the maintenance of fair and prosperous business conditions.

A. T. DeForest

J. E. Webster

Ownership Change to Foster Cooperation

"The steel manufacturing industry in California, and other western States, has recently experienced changes in ownership. An opportunity is presented, greater than ever before, for a leadership to be taken by these Pacific Coast steel makers in the adoption of policies which should lead to a cooperative service in the interest of the recognized distributers of steel products, also in the service of the growing, varied industries in the Pacific Coast territory. With that opportunity before them it remains for the producers, distributers and fabricators of steel products in this territory to adopt a constructive program and a more uniform business selling policy, and the maintenance of selling values that will bring a fair return on capital invested, quality of product and for service rendered.

"You will agree that conditions in this regard, throughout this territory, have been unsatisfactory and warrant prompt correction. It seems to me that these conditions can be rectified, if considered unselfishly, with an honesty of purpose and with the spirit of the Golden Rule.

"Are we willing to accept this opportunity? Have we the good sense to see the necessity for calling a halt in the varied and ulterior practices which have at such frequent intervals resulted in price upheavals and bitter price competition—at times long-lasting—all resulting in unprofitable business, together with possible bitterness in our personal relations?

To Patronize Local Producers

"I believe it to be the desire of the Pacific Coast steel manufacturers to make the distribution and use of their products profitable to merchants and consumers. Where that disposition is displayed by the producer, I believe it to be to the interest and the obligation of the distributers and consumers of those products to patronize them, and thus maintain the fullest possible operation of the Pacific Coast producing plants.

"The relation of the larger Pacific Coast steel producers, with eastern producing capacity, is such that a fair policy will naturally apply in connection with their eastern mill products in the Pacific Coast territory. The Pacific Coast steel makers cannot consistently be hostile to sharing with other American manufacturers a fair portion of the Pacific Coast steel tonnage at fair market prices.

Imports Not Gaining on Coast

"There appears to be no increase in the importation of foreign steel products; in fact, in some commodities there is a diminution of imports. The matter of importations should not be disturbing to us. The foreigner is entitled to a distribution of some of his tonnage in the large American market—the same as in other markets of the world, and as we are seeking the distribution of American products internationally. The great difficulty has been that buyers who have imported have reflected their cost advantage in the selling price to the disadvantage of other American distributers and fabricators—in short, have used their cost advantage to the end of buying business. So long as that policy continues, your secondary

market will be disturbed, and this should not be allowed to continue.

"The Pacific Coast steel mills are an important factor in your territory, as they have made large investments and are employing many thousands at liberal wage rates, thus building up a buying power in your community. That must not be overlooked, for it is buying power which is the backbone of business as a whole."

Corporation Policy Outlined

In commenting on the policy of the company he represents, Mr. De Forest said, "It would be the policy to operate these Pacific Coast plants to the fullest extent that the business of the territory will permit, thus affording steady employment to the workers. We expect further to improve our recently acquired properties, adding to equipment and further to diversify lines of product. We plan doing this, based on our belief in the Coast territory and in a constant growth of demand for our products. This seems assured by the increasing population throughout the West, also in the continued growth of diversified industrial operations, in California particularly.

"These facts should give you heart to cooperate to the fullest extent in the maintenance of these industries in your territory, without prejudice to others. I thank you for this opportunity to voice these expressions, which I feel are to the point and are warranted. I have confidence that common business sense will prevail with all of us, and will be the basis of our future policies."

Officers and Chairmen

A short executive committee meeting was held on the morning of Feb. 15 and officers and group committee chairmen were elected for the coming year. J. E. Webster was unanimously re-elected chairman of the executive committee. Ray M. Alvord, General Electric Co., San Francisco, was re-elected vice-chairman and Charles S. Knight, director, industrial department, California State Chamber of Commerce, was re-elected secretary.

Group chairmen were appointed as shown in the table.

Scrap Institute to Hold Its Annual Meeting

Among the subjects to be discussed by the Institute of Scrap Iron and Steel at its second annual meeting at the Hotel Stevens, Chicago, on March 4, 5 and 6 are alloy scrap, arbitration, contracts and trade customs, costs of yard operations, inspection of scrap, relations between brokers and dealers, relations with consumers and producers, research work, specifications and unfair trade practices.

Prof. Sturgeon Bell of the Ohio State University will deliver an address on "The Economics of the Scrap Iron Industry."

At a meeting of the Chicago chapter of the institute on Feb. 17, plans were made for the entertainment of the visiting scrap dealers. The Chicago chapter elected Frank Parker of Briggs & Turivas, president.

The Chicago chapter decided upon a plan of cooperation with the consumers of scrap in the Chicago district to insure the delivery of materials in accordance with specifications. A weights and grading committee was appointed, to which consumers have been asked to report all rejections of cast iron borings and short turnings, hydraulic compressed sheet scrap and heavy melting steel when rejections have been made because of "doctoring" of cars. In the event that the Chicago committee cannot eliminate the practice, the trade relations bureau of the institute will be asked to handle the complaints in cooperation with the Federal Trade Commission. William Ross, chairman of the executive committee, read letters from steel mills promising their cooperation in making the new plan effective.

William M. Hilb, Hilb & Bauer, Cincinnati, was elected president of the Cincinnati chapter of the institute at the annual dinner-meeting at the Van Cleve Hotel in Dayton, Ohio.

At the annual meeting of the St. Louis chapter, held at the Lennox Hotel, Feb. 20, William Rosenthal, of Hyman-Michaels Co., was elected president.

Blast Furnace and Coke Oven Program

On Friday, Feb. 28, the Eastern States Blast Furnace and Coke Oven Association will hold its mid-winter meeting at the William Penn Hotel, Pittsburgh. There will be two simultaneous meetings in the morning, one a blast furnace round-table under the chairmanship of Arthur W. Gittins, and the other a coke oven round-table with B. M. Stubblefield as chairman. In the afternoon the two groups will hold a joint meeting, presided over by Robert McEldowney.

At the blast furnace round-table there will be three subjects: Practical and Economic Advantages in the Newer Types of Cinder Pots and Hot Metal Ladles; Cost Per Ton of Pig Iron of Cleaning Blast Furnace Gas to 0.4, 0.15 and 0.02 Grain Per Cubic Foot; Specification of Other Dimensions for the Blast Furnace with 25-Ft. Hearth.

Coke oven subjects for the round-table include: Carbon Formation in Standpipes; Possibilities of Reducing the Cost of Sulphate Manufacture; Dehydration of Coke Oven Gas.

For the joint meeting there are four subjects: Effect Upon Gas of Pig Iron of Each 1 Per Cent Ash in the Coke; Sizing of Coke for Blast Furnace and Domestic Uses; Relative Merits of 14-In. and Wider Ovens, with Particular Reference to Coke Quality; Relationship Between Raw Materials Being Used and Operating Results Obtained from Blast Furnaces with Hearth Diameter 24 Ft. or More.

Albion H. Wardwell is chairman of the committee on arrangements, with C. L. Wyman, J. E. Lose and R. W. Campbell, the other members.

Thomas Prosser & Son, 15 Gold Street, New York, distributers of Krupp Widia cutting tools for the United States and Canada, have opened an office at 7338 Woodward Avenue, Detroit. Lynd-Farquhar Co., 326 Congress Street, Boston, and Eccles & Davies Machinery Co., 316 South San Pedro Street, Los Angeles, have been appointed by Thomas Prosser & Son, distributing agents for Widia tungsten carbide tools in their respective distribution.

Group Chairmen for Northern and Southern Regions

Southern California		Northern California
	Steel Mills	
William A. Ross, assistant to vice-president, United States Steel Products Co., San Francisco		Arnold Foster, vice-president, in charge of sales, Pacific Coast Steel Corporation
	Structural Steel	
Robert P. Miller, sales manager, Consolidated Steel Corporation, Los Angeles		C. H. Ramsden, manager, Pacific Coast Engineering Co., Oakland
	Foundries	
Carroll A. Stilson, secretary, Metal Trades Manufacturers' Association, Los Angeles		Charles Hoehn, president, Enterprise Foundry Co., San Francisco
	Merchant Steel Dealers	
E. Jungquist, manager, Percival Steel & Supply Co., Los Angeles		S. S. Barrows, manager, steel, tube and wire department, Dunham, Carrigan & Hayden, San Francisco
	Manufacturers	
George J. Kuhrts, Jr., Standard Boiler & Steel Works, Los Angeles		H. P. Phillips, Link-Belt, Meese & Gottfried Co., San Francisco
	Reinforcing Steel Dealers	
Ray A. Badt, vice-president, Badt-Falk Co., Los Angeles		Lon White, Pacic Coast Steel Corporation, San Francisco
	Traffic	
T. A. L. Loretz, Consolidated Steel Corporation, Los Angeles		Mr. Hoffman, Baker, Hamilton & Pacific Co., San Francisco
	Purchasing Agents	
E. F. Watkins, purchasing agent, Southern California Edison Co., Los Angeles		Frank R. Lloyd, president, Northern California Purchasing Agents Association, San Francisco
	Golf	
C. A. Denman, president, Denman & Greer, Los Angeles		H. W. Force, manager, California Corrugated Culvert Co., Berkeley, Cal.

Prospects for American

PROSPECTS for American business in Russia are discussed at some length in the February bulletin of the Union Trust Co., Cleveland, by W. J. Austin, president, Austin Co., Cleveland. Mr. Austin's article is so highly informing and there is so much propagandism on the industrial as well as political aspects of the Russian experiment that THE IRON AGE believes the somewhat generous extracts from Mr. Austin's article compiled in the subjoined will be particularly welcome at this time.

The illustrations on these pages are not his but are reproductions from a remarkable periodical just established by the State Publishing House of the Union of Socialist Soviet Republics. This first issue comprises 48 large size pages with large halftone engravings of work in progress—most, if not all, under the so-called five-year plan. It is from this publication that the accompanying pictures have been obtained.

What Mr. Austin reported is in part as follows:

"My views are based upon observations from actual negotiations with Russians over a period of some months preliminary to a contract, which we have accepted, to design and build an entire industrial city near Nizhni Novgorod, about 273 miles east of Moscow. This city will be designed eventually to house 50,000 people and it will include all living and recreation facilities built along modern lines. The plant which the city is to include is an automobile factory for the building ultimately of 500,000 Ford cars annually under arrangement with the Ford Motor Co. The cost of the whole transaction will be upward of $50,000,000.

"Our opportunities to study the Soviet officials in their capacity as business men and industrialists were excellent. George A. Bryant, Jr., executive vice-president of the Austin Co., directed the company's negotiations on the ground at Moscow, while in this country we dealt with the Amtorg Trading Corporation, the Soviet's American business representative.

"Our contract and the contracts of other American firms are all part of the famous five-year plan. In brief, it embraces a series of vast undertakings looking to the industrial upbuilding of a great country long over-

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THE locomotive assembling department of the Kolomensky works is regarded as one of the best in the Union of Socialist Soviet Republics. The Kolomensky plant appears to be a part of the so-called Gomza trust, or State combine of machine building factories. At those works a Diesel engine plant of over 275,000 sq. ft. area is under construction for completion this year.

Business with the Soviets

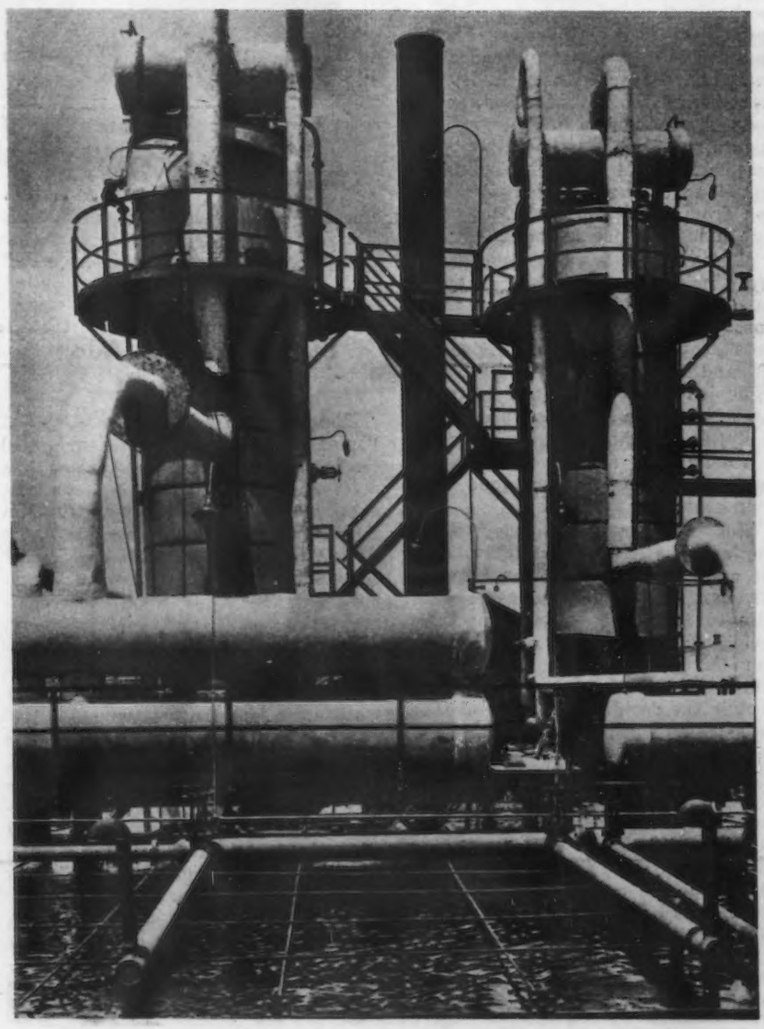
whelmingly agricultural. The five-year plan officially was put into effect in October, 1928. By October, 1933, the Soviets propose to have invested in industrial and agricultural development the sum of 32 billions of dollars.

"Russia also has limitless natural resources. She is now trying to adopt the most advanced technique of mass production. The present government is attempting a process of transformation of a country predominantly agricultural, with some 150,000,000 population, into one of the world's great industrial powers. It is proposed to accomplish in the fleeting space of five years what was accomplished in America over generations. Certainly there is no lack of vision, courage, or resolution on the part of the leaders of this extraordinary industrial plan.

"Such companies as the Ford Motor Co., the General Electric Co., DuPont de Nemours, the Oglebay Norton & Co., Newport News Shipbuilding & Drydock Co., and numerous others are engaged in some form of business activity with Russia. On the Dnieper River in the Ukraine, Hugh L. Cooper, the noted American engineer, is directing the construction of a $110,000,000 power project, which when completed will be one of the largest in the world.

"How are the Russians to pay for this vast five-year program? In a large measure the funds are to be raised by taxes, direct and indirect, and by the export of grain, petroleum, and other raw materials. Unfortunately, recently there has been some inflation in the Russian ruble and in most cases Soviets are paying for American technical service and goods in gold at New York. However, a number of large industrial companies are reported to be extending substantial credits to Russia.

"Our own contract calls for monthly payments of gold in this country. I have not heard of any one who has had cause to be dissatisfied with Russian payments or with Russian credit since the inauguration of the five-year plan. An indication of this is the gradual improvement of credit terms on Russian purchases. Both the amounts and duration of credits are increasing. But the matter of credit terms in any case is something which each company engaged in a transaction should examine carefully



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THE Graver system plant (at right), built by Azneft in connection with the refining of oil from the fields of Baku, is described as the last word in technique of the American oil industry.

Across the top of these pages are some of the workers' houses of Armanikand, one of nine industrial communities built for workers in oil fields and in factories.

and decide to its own satisfaction.

"The things Russia wants from America are technical assistance in designing and constructing industrial plants, power projects, and other large enterprises, modern industrial machinery for the production of manufactured products, tractors, and implements for the mechanization of farms, and machinery and equipment for building purposes. The pressing need for technical skill, of the American brand, is evidenced by the fact that in our contract provision is made for a specified number of Russian engineers to come to the United States and study our methods at first hand.

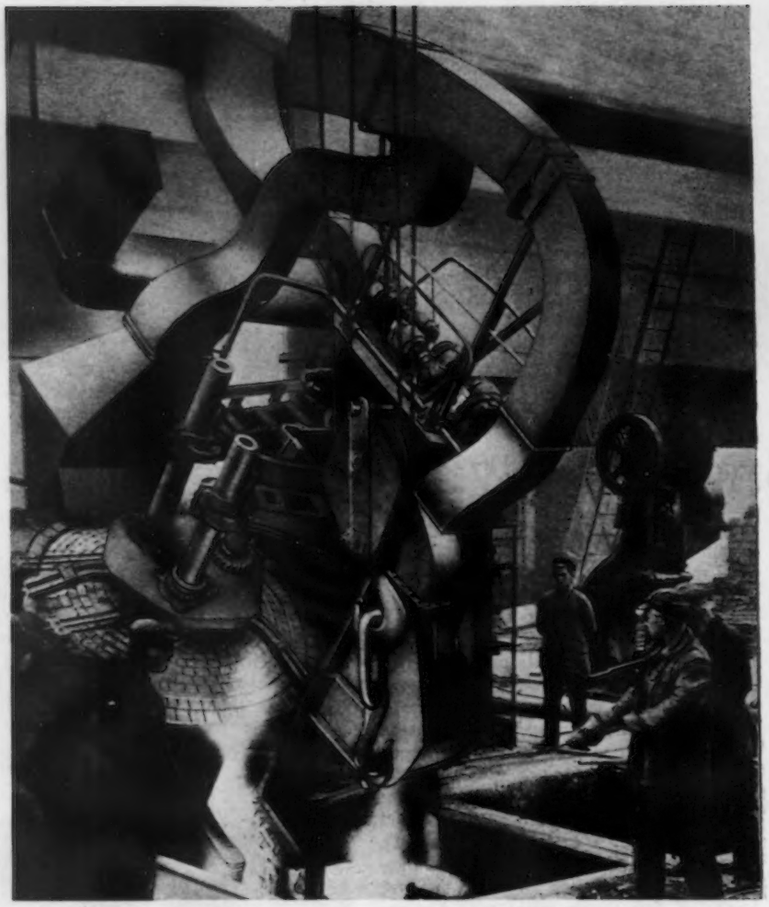
"There can be no doubt of the growing importance of Russia in American export business. The outcome of the five-year plan is a subject of debate of growing violence. I have no intention of taking any part in this controversy because I do not believe that anyone can adequately appraise at this time the probable degree of success or failure of the gigantic undertaking. Tremendous obstacles must be overcome, but in attempting to achieve their aim there is no lack of fervor and serious purpose on the part of those in control of the destinies of the Russian people.

"Some critics believe that Russia should make haste more slowly in the mechanization of industry. It is pointed out that, in Western Europe and America, mechanical trades and crafts have reached a high development before the advent of power and mass production in industry. It is maintained that Russia without this long background and solid foundation should go through a gradual transition from an agricultural stage to a high industrial development.

"These critics draw an analogy between industry and culture. They declare that a culture to be vigorous must be indigenous, must have its roots deep in the soil of a people's life and traditions. Therefore, they argue, instead of attempting to transplant America's advanced technique bodily, Russia should start simply and in a small way and develop her own peculiar industrial technique and equipment.

"For another thing, they doubt whether the Russian worker, who but a decade ago was bound to the soil, can adjust himself psychologically to the tempo of the machine. Soviet officials say the machine will gear the worker to its own tempo. Others believe that the human element is the deciding factor, and that the machine will have to be geared to the worker.

"But whatever the answer proves to be it is perfectly clear that the Soviets are correct in recognizing the necessity for haste. There is an urgent need for consumable goods which must be met with all possible speed. The experiment is one which will be watched with growing interest in this country and while it is proceeding, opportunities for American technical skill and for the sale of industrial and agricultural machinery are sufficiently attractive to appeal to many alert American business men."



In the Baltic Shipyards One of the Features of the Equipment Is an Electric Steel Furnace (Above)

Steel Founders Adopt Arbitration

The Steel Founders' Society of America, Inc., representing the steel castings plants of the country, has recommended to its members that an arbitration clause be incorporated in their purchase and sales contracts. At a meeting of the board of directors of the society, recently held in Pittsburgh, it was voted, upon the recommendation of Granville P. Rogers, managing director, to enter into a cooperative arrangement with the American Arbitration Association, under which the latter's tribunal facilities would be available to all of the society's members.

The terms of the agreement provide that the society accepts the arbitration rules of the association and approves the following arbitration clause for such voluntary use as its members may desire:

Any controversy or claim arising out of or relating to this contract or the breach thereof shall be settled by arbitration, in accordance with the rules, then obtaining, of the American Arbitration Association, and judgment upon the award rendered may be entered in the highest court of the forum, State or Federal, having jurisdiction.

The facilities and services of the arbitration association are made available to members of the society without charge, except for the payment of the following nominal arbitration fees, covering actual expenses incurred in the hearings, by the parties to the dispute, whenever an arbitration is held:

When the claim involves less than $1,000, each party pays $10 for the first hearing; when the claim involves $1,000 and less than $10,000, each party pays $25; when the claim involves $10,000 or over, each party pays $100. For each subsequent hearing each party pays one-half of the original amount. When the amount of the claim is not disclosed at the initiation of the proceedings, each party deposits $25.

The American Arbitration Association has a national panel of arbitrators composed of approximately 7000 men located in more than 1700 industrial centers of the country. These men, who are chosen because of leadership in their particular business or profession, serve without compensation when called upon to do so, and their services are available whenever a dispute arises in their communities which is submitted to arbitration.

In Moscow Is the Red Proletarian Machine Shop (at Right), Where Vertical Type Diesel Engines of 500 Hp. Are Built

Testing Engineers' Program at Detroit

For the first regional meeting which the American Society for Testing Materials has ever held, a program of 12 technical papers has been arranged. The regional meeting will take place at Detroit, March 19, during the week of March 17, when the usual group meetings of committees of the society are held. The program is a symposium on developments in automotive materials and has been arranged by F. O. Clements, vice-president of the society and director of research of the General Motors Corporation, and other local members of the society. The following program is scheduled:

Morning:

"Present-Day Methods in Production and Utilization of Automotive Cast Iron," by A. L. Boegehold, research laboratories, General Motors Corporation.

"Sheet Steel for Automobiles," by W. H. Graves, chief metallurgist, Packard Motor Car Co.

"Corrosion-Resisting and Heat-Resisting Steels for Automobiles," by Charles M. Johnson, chief chemist, park plant, Crucible Steel Co. of America.

"Advances in Die-Cast Metals for Automotive Use," by Charles Pack, consulting chemist.

"Developments in Light Metals and Alloys for Automotive Use," by Zay Jeffries, consulting metallurgist, Aluminum Co. of America.

"Automobile Bearing Metals," by Clair Upthegrove, associate professor of Metallurgical Engineering, University of Michigan.

Afternoon:

"The Significance of Various Tests for Motor Fuels," by R. E. Wilson, head, development and patent department, Standard Oil Co. (Indiana).

"The Significant Properties of Automotive Lubricants," by H. C. Mougey, assistant technical director, research laboratories, General Motors Corporation.

"Evolution in Automobile Finishes," by M. J. Callahan, chemical superintendent, chemical products division, E. I. duPont de Nemours & Co.

"Molded Plastics for Automobiles," by L. V. Redman, vice-president and director of research, Bakelite Corporation.

"Advances in Rubber for Automotive Use," by Walter C. Keys, chief engineer, automotive development department, United States Rubber Co.

"Recent Progress in Tests for Automotive Materials," by H. F. Moore, research professor of engineering materials, University of Illinois.

An informal dinner will close the day's program at the Book-Cadillac Hotel at which C. F. Kettering of the General Motors Corporation will be toastmaster, and at which the following speakers will give brief addresses: T. D. Lynch, president, A. S. T. M.; E. P. Warner, president, Society of Automotive Engineers, and R. G. Guthrie, president, American Society for Steel Treating.

By courtesy of the General Electric Co., a demonstration of audible light will be carried out at the dinner. Members of the local chapters of the S. A. E., the A. S. S. T. and the National Association of Purchasing Agents, will be guests of honor.

During the group meetings of the society at the Book-Cadillac Hotel, March 17 to 21, the following committees on steel and metals will hold meetings: A-1 on steel; A-2 on wrought iron; A-3 on cast iron; A-5 on corrosion of iron and steel; A-6 on magnetic properties; A-7 on malleable castings; A-10 on iron-chromium, iron-chromium nickel and related alloys; B-2 Sub-committees: Sub-Committee II of B-5 on cast metals and alloys; B-7 on light metals and alloys, cast and wrought; C-5 on fire tests of materials and construction.

Arrangements have been made for railroad transportation at fare and one-half round trip by the certificate plan.

Marmon Company Relieves Unemployment

In an attempt to aid in the elimination of unemployment in Indianapolis, G. M. Williams, president of the Marmon Motor Car Co., has announced a reduction in the number of working days from five to four, production being kept up by the addition of more men to the payroll. That there might be no inequality in the cooperative effort to give work to the jobless man, those who work on salaries rather than the hourly wage, are donating one day's pay each week to the welfare society of the plant to care for needy cases among employees and former employees of the company.

"There is a crisis, temporary we believe, that must be met," Mr. Williams told a meeting of employers in Indianapolis. "It is not a situation that can be cured by charity. It must be met by practical means. There are men out of work who must have work. They are our own kind of people. They are idle through no fault of their own. They are suffering and their families are suffering and we must meet the situation without subjecting them to the odium of charity or, in the cases of the weaker ones, illegal means of providing for their families."

West Coast Steel Industry

Historical notes on early attempts at making iron and steel in Washington, Oregon, California and Utah are contained in Engineering Experiment Station Report No. 2 of the University of Washington, Seattle. Prof. Joseph Daniels, the author of the bulletin, made the studies in 1924 and 1925, as a part of an investigation by Pacific Coast Steel Co. to determine the potentialities of the Northwest as a production region.

BOOK REVIEWS

Comprehensive Work on Air Engines

Modern Aviation Engines. By Major Victor W. Pagé. Volume 1: 990 pages with 466 illustrations. Volume 2: 930 pages, 453 illustrations, 6¼ x 9½ in. Norman H. Henley Publishing Co., New York. Price $9.

"Modern Aviation Engines" is a complete record of the development of the aviation engine. The book, as stated in the preface, is intended to be a text book on aviation engines for students who wish to become aviators or aviation mechanics, and is an almost complete record of articles published about the subject. Instruction books of the various engine manufacturers have been freely used as source material and a fairly complete story is given of how to take care of the various engines.

Requirements of an aviation engine are listed in detail. One of these stated requirements that seems slightly out of line with current practice is that "the best place for the gasoline tank is directly behind the engine and slightly above it." A gasoline tank in this position is very apt to cause a fire in case of a crash or nose-over. Enough of the principles of aero-dynamics are given to make it possible to understand the factors entering into aircraft engine design. The main requirements, of course, are lightness of weight, dependability, ability to operate at high speed and freedom from vibration.

A discussion of propeller speed and efficiency shows the main advantage to be gained by using reduction gearing and a high engine speed. These geared engines have been used quite extensively in Europe for high propeller efficiency and high horsepower output per pound of weight, and are now being introduced in the United States. The geared drive engines developed by the Pratt & Whitney Aircraft Co. have proved very successful and it can be readily seen that these engines are going to fulfill a great need.

After describing the requirements of an airplane engine, Major Pagé starts in with the beginning of thermo-dynamics. Carnot and Otto cycles are described and their application to present day gasoline engines. The discussion of the heat available and the mechanical efficiency of the engine gives a very complete and accurate picture of why cooling and high compressions are so very necessary in obtaining an efficient gasoline motor. The weight of marine and stationary Diesel engines is compared with aircraft engines. The main advantages of the Diesel engine as given by Major Pagé are the low cost of fuel, freedom from fire and relatively high efficiency. The marked advantage of the air-cooled engine in weight over the Diesel engine is not sufficiently stressed nor is the difficulty of starting the Diesel engine emphasized.

Society of Automotive Engineers' procedure for testing and measuring the engine power is given in full. These specifications should be followed in testing a new installation in order to have the tests on the same basis as other engines, so that the results can be fairly compared.

Quite a long section is devoted to describing the functions of the different parts used in the engine. Radial rotary engines are described and their disadvantages listed. I do not believe that there has been sufficient space given to the possible use of air-cooled "in-line" engines. There should also be further discussion of the possible use of multiple rows of air-cooled cylinders in radial engines. It also seems to me that the question of cost has entered into Major Pagé's discussion entirely too much. Cast iron cylinders, while cheaper, should not be used when for a very small additional amount of money and a great saving in weight, steel cylinder barrels can be used. With the rapid increase in the use of aluminum and aluminum alloys the cost is being reduced, and with a sufficient volume of production, aluminum and steel cylinder construction should be the rule.

Fuels have been treated in a very elementary manner, probably due to the fact that very few of the requirements have been standardized. Aviation engines require fuel which does not detonate and which is "anti-knock." There is at present a fairly definite means of determining the anti-knock value of a fuel as compared to some definite anti-knock fuel. West Coast crude usually has a higher anti-knock value than East Coast crude. However, the difference can be made up by properly doping the fuel with either benzol or tetra-ethyl lead. Benzol, of course, has a very distinct limitation in aircraft use due to its high freezing point.

The layout of the fuel system is described quite completely. In particular, the description of the Stromberg carburetors (which is a copy of the Stromberg carburetor manual) shows clearly its action, and this section should be very interesting to the student who desires to trace the path of the gasoline from when it enters the carburetors until it is fed to the cylinders.

The possibility of supercharging aviation engines is barely touched on. The centrifugal type of blower has been proved to be among the most successful, not only in forcing the gasoline into the cylinders but also having the advantage of completely vaporizing the gas. The basic principles of magneto ignition, full descriptions of the Bosch, Scintilla and Splitdorf are given. The question of magneto versus battery ignition is discussed at some length; in this the better efficiency of the magneto ignition is shown.

The discussion of oiling seems to be entirely too short. Various tests for lubricating oil are given, but a specification for an oil is not given nor are the types of grease for rocker arm and valve lubrication given.

Cooling systems are not described as completely as might be, since the book deals only with water and does not take into account the chemical cooling medium developed by the Army Air Corps. In the discussion of air-cooled engines, it should be emphasized that sufficient air must be provided, by proper design of cowling to keep its cylinders at the proper operating temperature.

In the second volume Major Pagé has collected the instruction booklets issued by a great many motor manufacturers. These descriptions give the important points about each engine and how it should be cared for. The Fairchild, Wright, Curtiss, Packard and Pratt & Whitney engines are described very thoroughly. Considerable space is devoted to a great many of the smaller modern engines. Installation is treated but this is merely a collection of what little has been written on this important subject. Some of the engine instructions are slightly out of date, as they are from books issued the early part of 1928. In the last chapter there is a very

(*Continued on page* 691)

Signs of Firm Business Recovery Are Lacking

BY LEWIS H. HANEY
Director, New York University of Business Research

FAVORABLE FACTORS

1.—Some improvement in heavy construction is indicated by (a) a large increase in "contemplated new construction," and (b) a small gain in the value of contracts awarded; a fair volume of structural steel bookings
2.—Automobile production increased sharply in January
3.—A spurt in steel buying; unfilled orders of the Steel Corporation made the usual seasonal gain
4.—Some improvement in the bank situation; gold imports in prospect
5.—The general reduction in rediscount rates indicates an easy money policy on the part of the Federal Reserve Board
6.—Improvement in business sentiment aided by the recent recovery in stock prices

UNFAVORABLE FACTORS

1.—Continued sagging of commodity prices to the lowest levels since early 1922
2.—The decline in employment and payrolls continued through January
3.—January department store sales declined and were only 88 per cent of normal
4.—Foreign trade backward
5.—Building contracts, in floor space, declined in January, and were very low
6.—Bank deposits declined and the loan-deposit ratio is high; member bank investments in other than government securities reduced
7.—Unfavorable statistical position of oil and copper, and very low railroad carloadings; signs of slackening in the demand for steel
8.—Business failures numerous and liabilities large; a good many scattered bank failures

WIDESPREAD commodity price weakness reflects considerable over-production. Purchasing power is reduced by unemployment and low farm prices, while exports lag. Retail trade has not yet picked up. When commodity prices become stable or rise, employment gains, and retail trade expands, and when bank loans are brought into normal relation with deposits, then we may expect the beginning of a real business recovery.

THE P-V Line (a general business barometer based on the ratio of commodity prices to the physical volume of trade) remained unchanged in January, and thus continued below normal. This is the longest period of virtual stability in the record of the barometer, which extends back through 1919.

Such a condition means an unparalleled parallelism between the physical volume of commodities and commodity prices—a parallelism that includes both direction and degree of trend. I think this can mean but one thing: that production and stocks of commodities became so large in 1929 that even the sharp curtailment of November and December failed to adjust the quantity supplied to the quantity demanded at current price levels. In this sense, there was general over-production.

Usually, after several months of decline in prices, industrial production is curtailed. Usually, as production declines and falls below normal, commodity prices rise. But prices have been drifting lower since the beginning of 1928, while production was pushed upward until the middle of 1929. Now both production and prices have been falling sharply together. The following conclusions seem justified:

(1) Most commodity markets are not in a position to support any large increase on the supply side.

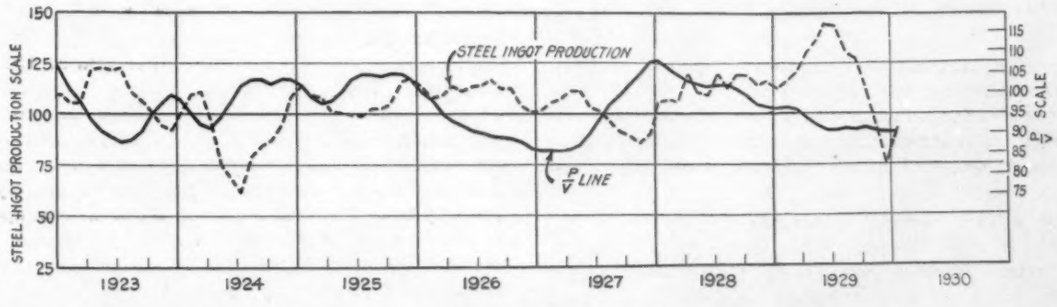
(2) "Rallies" in production at the present time are likely to be short-lived and to be followed by further downward readjustment.

(3) A permanently lower price level is being established, and the demand schedules of buyers are reduced all along the line.

That the P-V Line continues appreciably below normal is important. It means that the general run of commodities are in such supply that the desires and purchasing power of the average buyer are low in comparison with the cost of the average seller. As long as this is true, this barometer reads, "cloudy with occasional storms."

Steel production is, of course, tied in with the whole situation. No very close analogy with the past is to be found, but the present seems to resemble January, 1924, and January-February, 1927. Both comparisons suggest a more-than-seasonal gain in steel production during February and possibly March, to be followed by renewed recession—a recession based on the necessity for a more complete readjustment between demand and supply in general business.

The sidewise movement of the P-V Line, however, does not indicate any severe recession and suggests a period of stabilization ahead.



Sidewise Movement of the P-V Line Suggests a Period of Stabilization Ahead Rather Than Any Recession of Severity

This Issue in Brief

Claims a saving of 35 per cent in heat treating steel castings with gas, compared with electricity. Latter is figured at 1.1c. a kwhr. and gas of 530 B.t.u. at 48c. for 1000 cu. ft. Higher output is claimed also.—Page 637.

* * *

Considerable saving in fuel consumption in car-bottom type of gas-fired heat-treating furnace results from hooking two cars together. Annealed car, being withdrawn from furnace, automatically draws in the loaded incoming car. Operation of charging and discharging takes less than a minute, while previously 6 to 10 min. was necessary.—Page 639.

* * *

"Rallies" in production are likely to be short-lived and to be followed by further downward readjustment, says Dr. Haney. Sees no hope for a real business recovery until commodity prices become stable or rise and employment gains.—Page 657.

* * *

Tungsten-carbide tools of a superior quality are made by "hot press" method, says Dr. Hoyt. Pressing the carbide particles while being heated eliminates voids and results in a fine-grained agglomeration.—Page 647.

* * *

Savings in demurrage charges pay for steel hopper to store scrap. As day-by-day quantity of borings is not sufficient to load a car without paying demurrage charges, scrap is delivered into steel hopper, which discharges at intervals, through a hinged chute, into the car.—Page 632.

Important savings effected by handling scrap by conveyors. Scrap taken from the machines in wheelbarrows is dumped through openings in the floor which lead to conveyor systems in tunnels.—Page 631.

* * *

To obtain steel bars of unusually fine finish, new rolling mills have an extensive hydraulic system, for the purpose of removing scale by spraying the bars while in process of rolling.—Page 640.

* * *

Eliminates backfire or flashback in gas-fired heat-treating furnaces, which occurs at low rates of gas consumption with standard high-pressure equipment, by use of two-stage inspiration.—Page 638.

* * *

Additional charge for cold straightening merchant bars will be avoided on new mills. Cooling beds have been designed to deliver exceptionally straight bars to the shears, so that cold straightening will not be necessary.—Page 640.

* * *

Lengthen the life of galvanizing pots by avoiding temperatures above 900 deg. Fahr. At this heat the iron in the pot dissolves into or alloys with the zinc. The zinc-iron alloy disintegrates into dross crystals.—Page 636.

* * *

Losses in sintering turn to profits when 72-in. hearth sintering machine is used in place of 42-in. Limonitic iron ores, containing low silica, high moisture and large proportion of fines, and unsuitable for water concentration, are made commercially useful.—Page 642.

No severe business recession is indicated by PV forecasting line. Sidewise movement suggests a period of stabilization.—Page 657.

* * *

Foreign steel maker is entitled to his share of American business, says Pacific Coast steel maker, inasmuch as American mills are seeking foreign markets. However, buyers who use imported steel reflect their cost advantage in selling price, to the disadvantage of distributers and fabricators using American-made steel. —Page 649.

* * *

Changes in methods of manufacturing tungsten-carbide tools may be expected, says Dr. Hoyt, for the art is young. "Cold press" method is most common now. Grain size is under control up to 1500 deg. C., which is below the melting point.—Page 646.

* * *

Hot spots in gas-fired heat-treating furnace are avoided by means of positive recirculation of hot products of combustion, together with system of staggering burners, so that they fire from both above and below.—Page 639.

* * *

Zinc losses in galvanizing are due largely to oxidation at higher temperatures. Tests reveal that there is not an appreciable loss by evaporation.—Page 634.

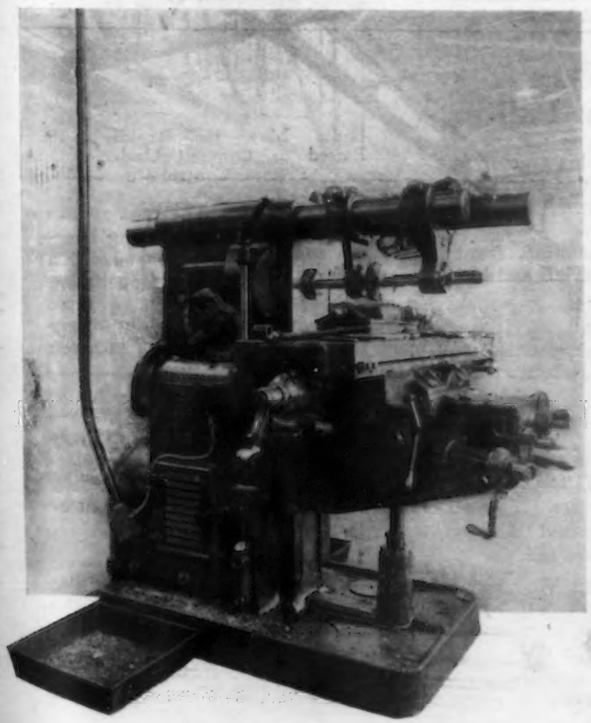
* * *

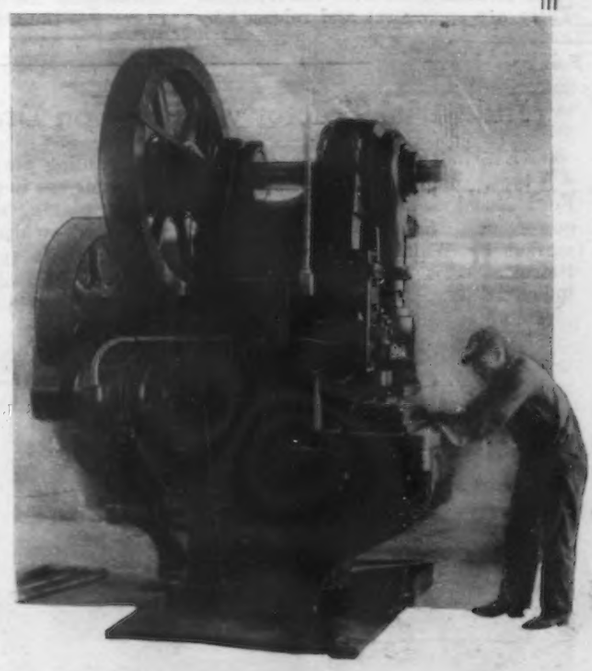
Iron castings annealed at 1250 deg. Fahr. in plant of material-handling equipment builder. Castings are allowed to cool in the furnace. Cooling cycle can be accelerated to any desired rate by opening any or all of five dampers.—Page 638.

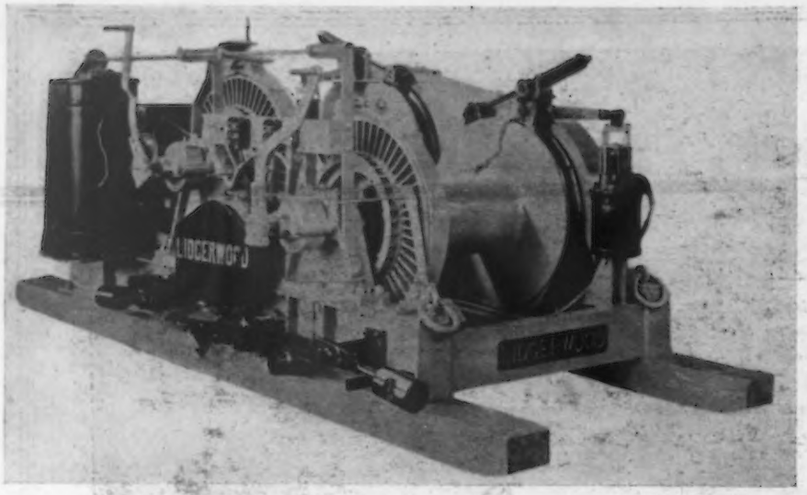
Machine Tools Run From Unusual Overhead Power Circuit

THREE machines are shown here in a group of pictures, each being run in the Bridgeport plant of the Sikorsky Aviation Corporation by electric power taken from overhead circuits of unusual flexibility. This method is shown most clearly in the photograph of the milling machine, wherein its motor-driven electric control arrangement is depicted. This overhead arrangement makes it possible to locate a machine almost anywhere it may be desired on the floor, and it will always be within easy reach of power.

Both the Lodge & Shipley 14-in. lathe and the stamping press used in making small metal parts have the same form of connection with the power circuit, and in general the same form of electric control. It will be noted that push buttons serve a large purpose in connection with all of this equipment.







Automatic Brakes Safeguard High-Speed Hoist

TO minimize accidents resulting from dropping loads, especially in congested districts, the Lidgerwood Mfg. Co., Elizabeth, N. J., has designed a new type of high-speed steel erectors' hoist equipped with emergency brakes. These are automatically set in case of either power failure or neglect of the leverman to keep his feet on the service brake levers. The hoist is built in the 100 h. p. size, duty 9000 lb. at 300 ft. a minute, for operation with three-phase, 60-cycle alternating current at 220 volts. A model is available for 440-volt operation.

As in the older hoists, the new type has band service brakes controlled by foot levers. These are used to govern the rope speed while lowering or to hold the drums while the frictions are disengaged. In addition, however, emergency V type post brakes are fitted to each drum over the frictions. These are spring set and released by means of motor-operated hydraulic rams.

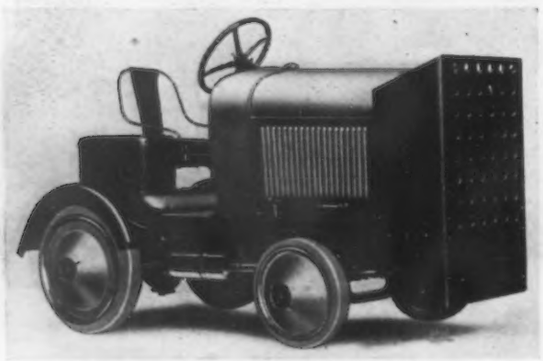
When power is cut off of the hydraulic operator motor, the piston descends, but it is necessary for the oil under the piston to pass out into the upper chamber of the cylinder. This gives a dash-pot action much superior to the sudden clamping action of the ordinary solenoid brake. If a load is running away and the emergency brake goes on, the more gradual application of the brake as obtained with the hydraulic operator is highly desirable as there is less chance of causing the hoist cable to break.

Although the drums have steel ratchets and pawls, the emergency brakes are used in place of these for regular service. The hoist is provided also with an automechanical non-reversing brake, which may be manually released by the operator if he desires to reverse the motor and hoist.

Industrial Tractor with ¾-Ton Drawbar Pull

A NEW industrial tractor, gasoline type, employing the standard Ford Model AA truck motor as its power unit, has been put on the market by Whitehead & Kaels Co., Detroit. It is known as the W&K industrial tug. Designed for industrial hauling purposes, this tractor is suited for use in and around manufacturing plants, warehouses, railroad yards and on docks.

The unit is spring mounted, front and rear, is 8 ft. long over-all and has a turning radius of 8 ft.



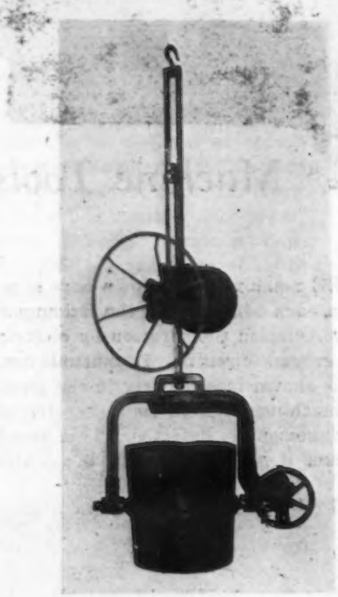
INDUSTRIAL "Tug" for General Service. The cone shaped disk wheels are self deflecting

Drawbar pull is about 1500 lb., with a speed of 19.7 miles an hour in fourth speed, at 2000 r.p.m. The total weight is approximately 2450 lb. A feature of design is the cone shaped, disk type, self-deflecting wheels. Dustproof bearing retainer plates eliminate the use of hub caps.

Pouring Metals Quickly with New Ladle Device

LADLES as large as 1000 lb. capacity can now be poured quickly and easily with a new pouring device designed by the Modern Pouring Device Co., Port Washington, Wis. The raising apparatus of this new machine consists of a planetary gear system operating on the ladle supporting rack. The large operating hand wheel enables quick raising and lowering, but under precise control, so that the ladle can be quickly spotted at any desired height.

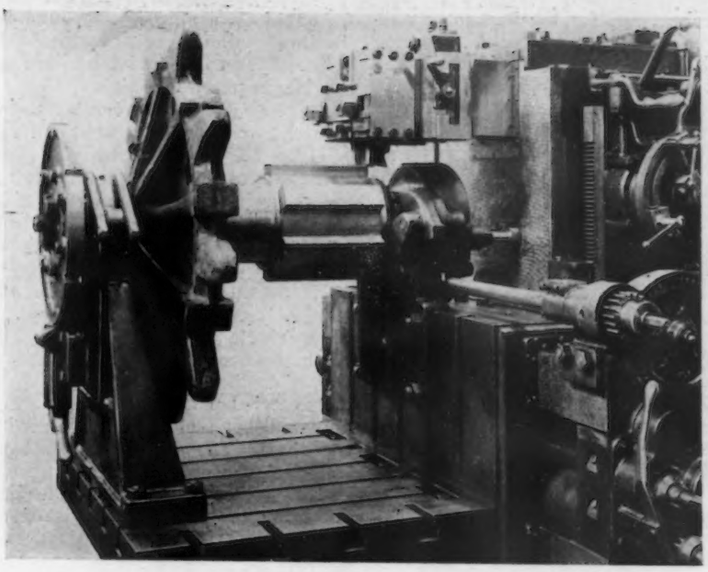
The machine is of all steel construction and all movable parts operate on ball bearings. The rack rollers are bushed with self-lubricating bearing metal. The ladle is equipped with a totally inclosed worm wheel operating in a bath of oil. The worm operates on roller bearings and has an adjustment to take up lost motion between it and the gear.



Ladle May Be Rapidly Raised or Lowered Under Precise Control

The machine also has other applications in the foundry where it provides a quick means of handling loads and still does not require air or electric power. For this work the raising rack is equipped with either a bail or a single hook at the lower end.

Mechanical lapping is to be discussed at the meeting of the American Society of Mechanical Engineers on the evening of March 20 at the Downtown Club, Newark, N. J., by Sydney Blayer, Norton Co., Worcester, Mass.



Draw-Cut Shaper Fixture for Splining Sprocket Hubs

A SPECIAL attachment for cutting splines on the hub of cast steel drive sprockets and similar parts is here shown in use on a 38-in. stroke high-duty draw-cut shaper.

Both the attachment and the shaper are built by the Morton Mfg. Co., Muskegon Heights, Mich. The attachment, which will rotate 360 deg., is indexed and equipped with rotary feed for circular cutting. The machine is furnished with power rapid traverse, both horizontal and vertical, and has a double cutting head to permit use of either one or two tools for shaping the keys on the hub. Ease of operation, with marked economies in machining of hubs and other pieces is claimed.

Morton draw-cut shapers are regularly equipped with an auxiliary table, standard swivel base vise and shaper head and with a jib crane having a one-ton two-speed hoist.

New Vertical Milling and Die Sinking Machine

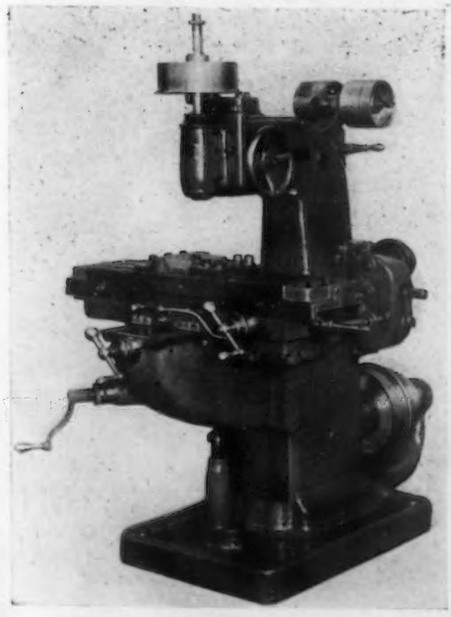
MOUNTING of the longitudinal feed screw in Timken bearings, taking all thrust and radial loads, is a feature of the new No. 3 vertical milling and die sinking machine recently brought out by the Reed-Prentice Corporation, Worcester, Mass.

The machine also has a hand-feed handle located at the front and at the right-hand end of the table, which permits hand longitudinal feed from the front of the machine as well as at each end of the longitudinal screw. A new rotary table having 16½-in. diameter working surface adds to the range of the machine. This table is equipped with hand and power feeds and is graduated to 360 deg. The hand-feed wheel is now located at the front of the machine table, providing centralized control.

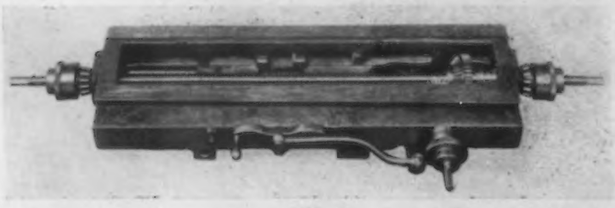
Ball-bearing spindle and pulley construction permits spindle speeds up to 4000 r.p.m. The spindle is carried in three ball-bearing mountings and is provided with an auxiliary support carrying double-row ball bearing, eliminating belt pull on the spindle. Idlers and lower cone pulleys also run on ball bearings. The standard machine with cone for countershaft drive provides 12 spindle speeds, available through two spindle drive pulleys, 5½ and 10 in. in diameter. Proper belt tension is secured through an adjustable idler pulley bracket.

The saddle extends the full length of the table and has a wide center bearing on the knee. Cross, vertical and longitudinal feed screws are equipped with micrometer dials. The cross feed screw is provided with ball thrust bearings. Power longitudinal table feed is obtained through the feed cone pulleys and a sliding gear box with hardened steel gears. Six feeds are available.

The longitudinal feed, power, is 21 in.; the cross feed, 12 in.; and the vertical feed of the knee, 17 in. The head travel is 3½ in. The maximum distance between spindle and table is 16½ in.; between spindle and rotary table, 12 in.; and between spindle and frame, 16 in. The working surface of the machine table is 10¼ x 30¾ in. Feeds per revolution of the spindle, longitudinal, range from 0.0018 to 0.043 in. and the feed per min., from 0.3 to 60 in., with standard speeds of 95-2500 r.p.m. Floor space occupied is 67¾ x 72¾ in. The net weight of the machine without rotary table, is 2400 lb. Motor drive arrangement, with either constant speed or adjustable speed motor, can be furnished, the motor being mounted on a bracket attached to the rear of the frame.



VERTICAL Miller and Die Sinker for Engraving, Light Die Work, Toolroom and General Manufacturing. Spindle speeds up to 4000 r.p.m. are obtainable. A feature is the Timken mounting of the longitudinal feed screw, as pictured below



The Purchasing Agents Association, Cleveland, will hold its ninth annual dinner at the Mid-day Club, Feb. 27. The speaker will be William B. Stout, vice-president, Stout Metal Airplane Co. John R. Whitehead, president of the National Association of Purchasing Agents, is also scheduled to speak.

Variable and Reversible-Flow Pump

FOR machine tool builders and other manufacturers operating assembly and test floors, a motor driven variable and reversible-flow pump is offered by Tuthill Pump Co., 131 West Sixty-third Street, Chicago. This pump provides a convenient, portable unit particularly adapted both for filling gear boxes with oil during testing and for withdrawing the oil afterward. The action is accomplished through the ability to reverse the flow of the oil without reversing the rotation of the motor.

Such a motor-driven variable and reversible-flow pump is a practical unit also for flushing gear boxes with kerosene after a running-in test, as the liquid may be pulled out simply by reversing the flow.

Offers Line of Welded Steel Straight Sided Presses

STRAIGHT sided presses the bed, overhead members, uprights, ram and bull gears of which are of welded steel plate construction have been introduced by the LaSalle Machine Works, Inc., 3013 South LaSalle Street, Chicago.

Advantages claimed for this construction include increased strength with less weight, which favorably affects freight charges, floor load and foundation expense. The welded steel also permits economical alteration of the standard machine to provide for unusual dimensions desired by the user.

The machines can be furnished with single, double or triple cranks. The heavier presses are provided with motor adjustment of the ram, Texrope drive, one-shot lubrication, bronze-bushed main bearings, Timken roller bearings for the backshaft and flywheel and multiple-disk friction clutch. Shearing pins in the backshaft are intended to prevent damage due to overloading or improper die setting. The company's inclinable presses with welded steel frames were described in THE IRON AGE of Jan. 23.

Synchronous Motor-Driven Air Compressors

TO supplement its belt and steam-driven machines, the Gardner-Denver Co., Quincy, Ill., offers a new line of duplex two-stage synchronous motor-driven air compressors.

The new units are of the duplex two-stage heavy-duty type, with the motor placed between the two main bearings and mounted directly on the crankshaft. The main shaft is of solid steel forging, oil treated and annealed for maximum strength.

A new feature is the use of roller bearings for the main shaft. This elimination of friction keeps the main shaft, cranks and connecting rods in alinement and increases the life of the entire unit.

Steel Mill Panels Have New Master Switches

MAGNETIC controllers for steel mill auxiliaries have been redesigned by the General Electric Co. A number of improvements have been incorporated in the new line. A separate line contactor, used instead of a "circuit breaker" contactor, allows complete isolation of the motor and starting resistor from the source of power.

An additional relay is used for under-voltage protection. All devices are mounted on a single, compound base in the smaller panels, up to 55 hp., while three compound bases are used for larger panels.

A new type overload relay not affected by vibration is used. This is said to be very accurate in adjustment and uses but one size of coil for the entire range of horsepower of any given panel. Many of the parts of the overload relay are interchangeable with those of the accelerating relays.

New master switches have been developed for use with the panels, to allow single or three-point operation of the line contactor. Each switch includes double-break, silver-faced contacts carried on molded operating arms actuated by molded cams bolted to the shaft. The switch handle has a well-designed grip and may be locked in the "off" position. The redesigned line has a new type of edgewise-wound resistor especially arranged for mill service.

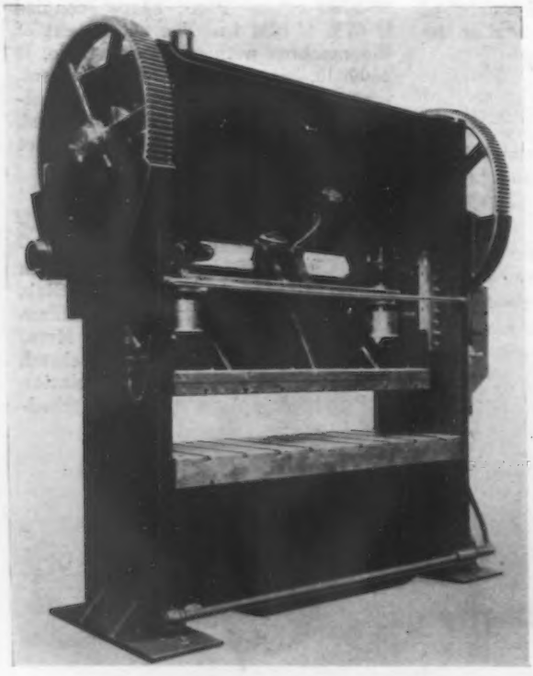
High-Frequency Motor on Abrasive Sander

A COMPACT and light "Take-About" sander with a high-frequency motor has been built by the Porter-Cable Machine Co., Syracuse, N. Y. A frequency of 180 cycles gives a maximum motor speed of 10,800 r.p.m. This is a safe speed for ball bearings and rotating parts and a rotor of given size develops three times as much power as is obtainable from a frequency of 60 cycles.

Tapered collars serve to prevent dirt accumulation. The worm gear is hardened and ground to withstand the high speed. The motor is rated at 1½ hp. and is capable of developing 1.9 hp.

This power is sufficient to drive the belt at the high speed of 1800 ft. a minute. Even under extreme loads this speed is constant, with no falling off until a high load point is reached. Because of the high belt speed, this model is extremely valuable on body and metal work, both for grinding and polishing. As the belt works in a straight line, it leaves no cross scratches and secures a finish regarded equal to a ground surface.

A belt can be used on slightly curved surfaces, because of its flexibility. Versatility in work is obtained by merely changing the abrasive belt.



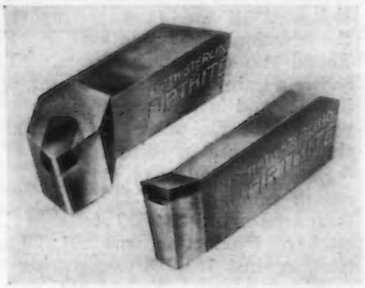
WELDED Steel Plate Construction Gives Increased Strength with Less Weight, and Permits Economical Alteration of Standard Dimensions to Suit Particular Requirements

The Belt Speed Is 1800 Ft. a Minute (At Right)

Mechanically Held Tungsten-Carbide Cutting Tips

FOR exceptionally severe cutting operations the Firth-Sterling Steel Co., McKeesport, Pa., has developed a line of tools with mechanically held tungsten-carbide or Firthite tips.

Designated as the Mechanigript tip, the development is designed particularly to overcome difficulties which might arise with brazed or welded



The Tungsten Carbide Tip Is Fixed in a Recess in the Shank and Is Not Dependent Upon Brazing Nor Welding for Secure Holding

tips when the severity of the cutting operations causes the tungsten carbide tip to become heated to a high temperature. Under such conditions the brazing tends to soften on brazed tools, often causing the tips to loosen and come off. In the case of the welded tip under similar conditions, the difference in the expansion and contraction of the material in the tool steel shank and that of the tip may eventually cause the tip to crack on account of repeated stressing during heating and cooling.

The Mechanigript tip, here illustrated, is fixed in a recess in the tool shank and is not dependent upon brazing for security, nor is it rigidly secured to the shank as in welding. Differences in expansion and contraction consequently are said to have no effect on the mechanically-held tips, and, to make for added strength, the tip and the shank are so constructed that the pressure of the work against the tip keeps it securely in place against the forces which are brought to bear upon it. A thin film of copper between the Firthite tip and the recess in the shank affords the lubrication that is desirable for the very slight movement of the tip under changing conditions of heating and cooling in severe cutting operations and helps conduct heat rapidly from tip to shank.

The properties of tungsten carbide have made it impractical to furnish tools made entirely of this material and it has been found necessary to change radically the tool designs and practices which have been evolved. Brazed and welded tips, most commonly used, have been successful on ordinary production operations. Use of the new Mechanigript tip is especially recommended by the makers, for heavy cuts, unusually high speed or on unusually difficult materials.

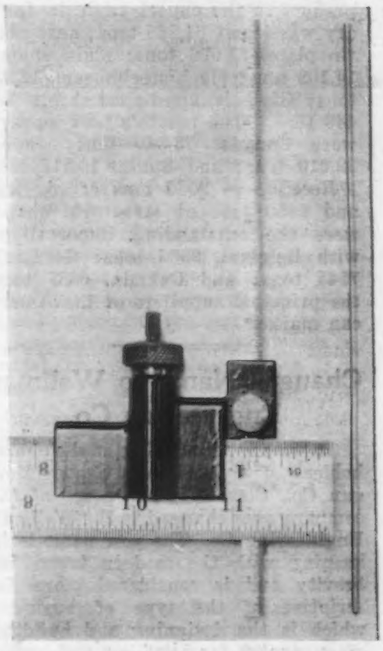
To obtain the best result from the new Firthite tools, thin cutting edges should be avoided wherever possible and as much support as can be obtained from the steel shank should be given against all stresses that may be expected from the particular operation on which the tool is used. Generally speaking, tungsten-carbide tools should be as large as or larger than the high-speed steel tools they replace.

Warped pieces may be straightened and with a slight adjustment of the wedges, it is possible to obtain almost any desired bend in any class of material within the capacity of the machine.

Depth Gage Attachment for Combination Squares

A DEPTH gage attachment for use with 9, 12, 18 and 24-in. combination squares and sets made by the Brown & Sharpe Mfg. Co., Providence, has been announced by that company.

This attachment, designated as the



The Attachment Is Particularly Useful for Measuring the Depth of Wide Recesses

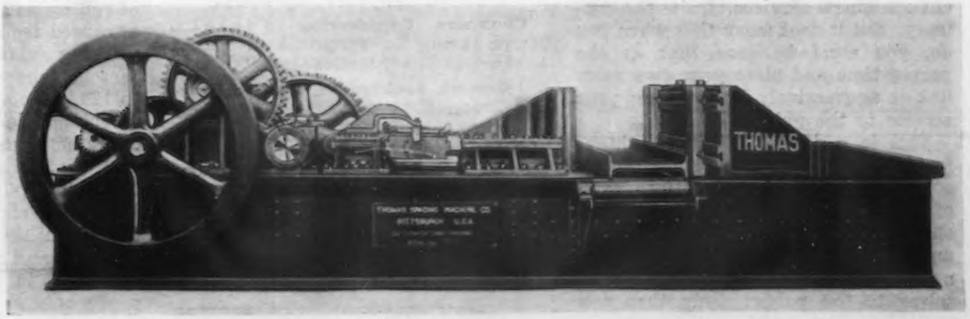
No. 468, measures directly from the lower edge of the blade of the square or set and is particularly useful for measuring the depth of wide recesses. The range of the English measure attachment is from 0 to 4½ in., the 6-in. blade being graduated in 32ds and 64ths, or in 64ths and 100ths. For metric measurements the range is from 0 to 114 mm., the 15-cm. blade being graduated in millimeters and half-millimeters. A 5/64-in. diameter rod is furnished for use in small holes. The attachment cannot be used on combination squares and sets having heavy blades.

Shape Bending and Straightening Machine

USE of both riveting and welding in the construction of the frame is a feature of the bending and straightening machine illustrated which has been brought out by the Thomas Spacing Machine Co., Pittsburgh. The machine is of simple design and is intended to handle structural shapes of all sections. It is built in 150 and 200-ton sizes.

All parts of the frame that take thrust loads are both riveted and welded, although the riveted construction alone is said to carry the maximum capacity of the machine with a large factor of safety. This frame construction, a departure from the usual practice in such machines, is claimed to provide a much lighter and stronger unit.

All gears are of steel and have cut teeth and the camshaft is a steel forging. The ram and bolster blocks are also made of steel.



ALL Frame Parts Taking Thrust Loads Are Both Riveted and Welded. The machine is for structural shapes and is built in 150 and 300-ton sizes

Steel Exports Heavier While Imports Decline

WASHINGTON, Feb. 25.—Exports of iron and steel products from the United States in January totaled 225,090 gross tons, according to preliminary figures prepared by the Iron and Steel Division, Department of Commerce, and exceeded by 9848 tons, or 4.6 per cent, exports in December, 1929, amounting to 215,242 tons.

Imports in January were 42,314 tons, a decline of 5172 tons, or 10.9 per cent, from those of December, aggregating 47,486 tons.

In point of tonnage the principal product in the export trade in January was scrap, 61,865 tons; next came tin plate, 25,026 tons; plain shapes, 14,109 tons; black steel sheets, 12,959 tons; and galvanized steel sheets, 10,449 tons. The month's best markets were Canada, 73,340 tons; Japan, 39,010 tons; and Spain, 10,313 tons.

Receipts of 9080 tons of pig iron and 9850 tons of structural shapes were the outstanding importations, with Belgium, 9966 tons; Germany, 7545 tons; and Canada, 6837 tons, the principal suppliers of the American market.

Changes Name to Wellman Engineering Co.

At the annual meeting of the shareholders of the Wellman-Seaver-Morgan Co., Cleveland, the name of the company was changed to the Wellman Engineering Co. The new name is in keeping with the modern trend for brevity and is considered more descriptive of the type of business, which is the designing and building of apparatus for handling and transporting raw materials from the mine to the finished products. This includes steel works equipment, car dumpers of all types, coke-oven machinery, port and terminal equipment, hoisting machinery for mines, special cranes, coal and ore handling machinery, gas producers, valves, flues, etc.

New Services, New Products Must Be Interpreted

It is a responsibility of the selling link of your business to study the requirements of the public and to recognize that the public has the biggest of all influences on your business. This does not mean that you should not introduce new articles, new merchandise, new services. Quite the contrary. But it does mean that when you *do*, you must be sure that at the proper time and place your own sales link is aggressively interpreting your service to the public.

This is a day of public enlightenment. Advertising pages and editorial columns are full of explanations, even of the most intimate nature. The day of secrecy with its misunderstandings and suspicions is past. Future businesses must fully interpret themselves to the public. Only then can the public recognize proper standards and be able to judge the value received for the money it spends.—From an address on "Your Future Business" delivered by D. M. Strickland, manager development department, sales division, American Rolling Mill Co., before the Ohio Sheet Metal Contractors Association at Toledo, Feb. 19.

Weirton Contracts for Rail-Structural Mill

The Weirton Steel Co., a unit of the National Steel Corporation, Pittsburgh has contracted with the United Engineering & Foundry Co. for a rail and structural mill for its Weirton, W. Va., plant. The purchase involves an expenditure of $3,500,000.

Immediate construction of the mill is provided for, and it is expected to be completed and in operation by the close of the year.

Ironite—A New Iron Alloy

The Kinite Corporation, Milwaukee, announces the development of "Ironite," a new alloy of iron, as partner to Kinite, but at a lower price. In a less degree, ironite provides the same advantages as kinite.

Ironite, because of its close, uniform grain and toughness, is claimed to have unusual abrasive and compression resistance but does not wear so long as kinite. It is cast-to-shape like kinite thus saving machining and permitting dies to be cast in one piece which would have to be made in sections if forged. Ironite is an electric furnace iron. Among other alloys, chromium, vanadium and nickel play an important part in its composition. It is recommended for forming dies, machine parts or wherever a close texture, tough alloy iron is needed.

COMING MEETINGS
MARCH

National Management Congress. March 3 to 5. Hotel Stevens, Chicago. Sponsored by management division of American Society of Mechanical Engineers, American Management Association, Society of Industrial Engineers and National Association of Cost Accountants.

Institute of Scrap Iron and Steel. March 4 to 6. Second annual meeting, Hotel Stevens, Chicago. Benjamin Schwartz, 11 West Forty-second Street, New York, director general.

American Society of Mechanical Engineers. March 5 to 7. Materials handling meeting, Stevens Hotel, Chicago. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

Cleveland Engineering Society. March 14 and 15. Fiftieth anniversary, banquet at Hotel Hollenden.

American Society for Testing Materials. March 18 to 21. Spring group committee meetings, Book-Cadillac Hotel, Detroit. C. L. Warwick, 1315 Spruce Street, Philadelphia, secretary.

National Safety Council. March 18. Eighth annual Midwest safety conference, Palmer House, Chicago. John Eib, Illinois Steel Co., Joliet, Ill., chairman metals section.

Sheet Sales Up 60 Per Cent in January

The improvement in the sheet steel industry since the first of the year is indicated in the January report of the National Association of Flat Rolled Steel Manufacturers. This shows a gain of over 60 per cent, both in sales and in production, when compared with December, as well as a sharp increase in shipments.

Sales by independent mills last month amounted to 382,122 net tons, compared with 234,599 tons in December. Production was 291,529 net tons, against 181,916 tons during the previous month. Shipments gained over 60,000 tons, being 241,677 tons, compared with 178,575 tons in December, and unfilled orders on Feb. 1 amounted to 558,412 tons, against 443,127 tons on Jan. 1. The January report and comparisons in net tons follow:

	Jan.	Dec.	Nov.
Capacity per month	556,000	452,700	461,800
Percentage of capacity reporting	67.5	67.0	67.1
Sales	382,122	234,599	134,391
Production	291,529	181,916	204,071
Shipments	241,677	178,575	207,200
Unfilled orders	558,412	443,127	395,696
Unshipped orders	117,584	101,008	107,056
Unsold stocks	73,948	72,611	71,680
Percentages of Capacity			
Sales	101.8	77.4	43.3
Production	77.6	60.0	65.8
Shipments	64.4	58.9	86.8
Unfilled orders	146.2	146.2	127.6
Unshipped orders	31.3	33.3	34.5
Unsold stocks	19.7	24.0	23.1

Rise in Industrial Use of Electricity in January

Industrial consumption of electricity, according to *Electrical World*, stood at 121.8 in January, compared with 116.4 in December. The index is based on electrical energy consumption by about 3600 scattered manufacturing plants, with average monthly activity during 1923-1925 as 100.

Recovery from the depression by the metal industries group was at a greater rate than that for industry in general. This group went up from 124.9 in December to 132.9 in January. All of this gain was in the list of rolling mills and steel plants, which advanced from 120.5 to 143.1. Metal-working plants, ferrous and non-ferrous, showed a fractional decline to 126.7, from 127.2 in December.

Automobile plants, including those manufacturing parts, advanced from 79.4 to 99.8 and shipbuilding, from 120.4 to 124.4. Most of the other industries showed gains, but reductions are noted in forest products, chemical and allied products and, particularly, in stone, clay and glass products.

By-Product Coke Follows Pig Iron

Record Activity in 1929 Parallels That of Blast Furnaces—Three New Plants Started Operations During Year

WASHINGTON, Feb. 24.—By-product coke production in January totaled 4,203,323 net tons, a daily average of 135,591 tons, an increase of 0.5 per cent over the December average, but a decrease of 3.6 per cent compared with the average in January of last year, according to the Bureau of Mines. Beehive coke production in January decreased to an estimated 309,200 tons, against 344,900 tons in December.

A new by-product plant has been added to the list of producers, that of the Wisconsin Public Service Co., Sheboygan, Wis., with 15 Koppers-Becker ovens. In addition, the Providence Gas Co., Providence, R. I., has fired its battery of 25 Koppers-Becker ovens. There are now 88 coke plants in active operation, and during January, the bureau said, they produced about 83.5 per cent of their capacity.

Record by 10.7 Per Cent

In its preliminary figures of coke production in 1929, the bureau showed 53,475,500 tons of by-product and 6,015,000 tons of beehive fuel, making a total of 59,490,500 tons. The by-product output established a record, an increase of 10.7 per cent over 1928, with a total of 48,313,025 tons of by-product coke, the previous record.

The bureau pointed out that the chief cause of the increase in coke production last year was the greater activity of blast furnaces, citing THE IRON AGE figures to show that pig iron production made a gain of 11.8 per cent over the level of 1928. By-product production last year was 89.9 per cent and beehive production 10.1 per cent of the total coke output last year, against 91.5 and 8.5 per cent, respectively, in 1928.

As usual, Pennsylvania was by far the largest producer of by-product coke last year, making 14,654,900 tons, an increase of 1,179,600 tons or 8.8 per cent over the 1928 output of 13,475,300 tons. Ohio, ranking second, produced 8,480,300 tons, an increase of 694,100 tons or 10.5 per cent over the 1928 output of 7,786,200 tons. Indiana ranked third, producing 6,392,700 tons, an increase of 298,500 tons or 4.9 per cent over the production of 6,094,200 tons in 1928. Alabama produced 4,738,800 tons, an increase of 411,500 tons or 9.5 per cent over the 1928 output of 4,327,300 tons. Illinois produced 4,179,000 tons, making the sharp gain of 938,000 tons or 28.9 per cent over the 1928 production of 3,241,000 tons.

Of the 1929 by-product coke production, 41,549,000 tons was made in ovens connected with the 47 active furnace by-product plants, representing 77.7 per cent of the total by-product output. Production at 46 active furnace by-product coke plants in 1928 was 38,244,254 tons, or 79.2 per cent of the total. This percentage has ranged since 1919 between 76.1 and 80.4, having been substantially lower in earlier years. Estimated tar recovery at by-product plants last year was 698,923,000 gal.; ammonia, 1,768,612,000 lb.; gas, 858,815,000,000 cu. ft.; and crude light oil, 208,553,000 gal.

Stocks of by-product coke on hand at producers' plants on Jan. 1, 1930, amounted to 2,173,923 tons, an increase of 380,974 tons, or 21.2 per cent, over the 1,792,949 tons on hand on Jan. 1, 1929. The largest proportion of the increase was represented by the larger stock piles at furnace plants, where reserves on hand at the end of 1929 were above those at the beginning of the year by 281,715 tons, or 36.7 per cent.

Three new by-product plants started operations in 1929. In January, the Rockford Gas Light & Coke Co., started its new plant at Rockford, Ill.; in February, the Philadelphia Coke Co., began making coke at Philadelphia. In October, the Davison Coke & Iron Co., fired a group of 35 ovens at Neville Island, Pa., followed by a second group of the same size in November. The total number of ovens added by those operations was 165. In addition, 96 ovens were installed and fired at existing plants. At the close of 1929, there were 408 ovens under construction.

Great Lakes Steel Mill to Be Ready in Late Summer

The Great Lakes Steel Corporation, a unit of the National Steel Corporation, will have its $20,000,000 plant at Detroit completed and will start making steel by the latter part of August or early in September, according to an announcement by George R. Fink, president of National Steel.

"Construction work at our Detroit mill is progressing rapidly," said Mr. Fink, "and we will have the plant completed on schedule, notwithstanding the fact that the work has been delayed a little by one of the most severe winters in history.

"Completion of this plant will mark another step in the development of Detroit as a steel center. The Great Lakes plant will have a capacity of 500,000 tons a year at the outset, and is so constructed that capacity can be enlarged as needed. It will make bars, shapes and sheets. It is ideally situated, from the standpoint of transportation, with waterfront rights on the Detroit River and sidings from the Michigan Central and Detroit, Toledo & Ironton Railroads.

"The output of the Great Lakes plant can be largely marketed in the Detroit industrial area, although the company, through the freight advantages which it enjoys, will also be in position to compete advantageously for business in many other territories, including the Atlantic Coast and export markets. Michigan in 1928 consumed 2,343,000 tons of steel aside from steel rails. Of this total, 870,000 tons was made up of sheets, 131,000 tons of rolled shapes, and 722,000 tons of bars. Our new plant will be in an ideal position to handle the steadily growing tonnage of these products."

Borg-Warner Buys Plant to Make Special Steel

The Borg - Warner Corporation, through its subsidiary, the Galesburg Coulter-Disc Co., has acquired the assets of Chicago Rolling Mills, Inc., located at West Pullman, Ill. The Chicago Rolling Mills acquired the West Pullman property in September, 1929. It comprises 17 acres of land, a group of buildings, and adequate switch tracks. A $1,000,000 program of rehabilitation and conversion undertaken by the company's management will be continued under the Galesburg Coulter-Disc ownership. The new property will be equipped to produce special steel for the agricultural implement, tractor, truck and automobile industries. S. L. Ingersoll will be manager of the new unit.

To Merge Eaton Axle and Wilcox-Rich

The Wilcox-Rich Corporation, Detroit, will be merged with the Eaton Axle & Spring Co., Cleveland, under an agreement that has been reached by directors of both companies, subject to stockholders' approval. A joint statement announcing the proposed merger has been issued by J. O. Eaton, chairman of the Eaton company, and Carlton M. Higbie, chairman of the Wilcox-Rich Corporation. The scope of the Eaton company has been further broadened by the acquisition of the Peterson Spring Co., Detroit, maker of springs for valves, brakes, dies and locks. Heretofore the Eaton company has confined its spring manufacture to leaf springs.

The Wilcox-Rich Corporation has four plants located in Detroit, Saginaw, Battle Creek and Marshall, Mich., where it manufactures valves, tappets, piston rings and other parts for gasoline motors, automobiles, airplanes and trucks. The operation of the Peterson plant in Detroit, which is occupied under lease, will be discontinued and the equipment moved to the Eaton plant in that city.

More than 200 members of the engineering and sales departments of Cincinnati Grinders, Inc., assembled at the Chamber of Commerce dining room, Cincinnati, Thursday night, Feb. 20, as guests of the Cincinnati Milling Machine Co., the parent corporation, for the annual dinner. Gold service buttons were presented to Kenneth Schledhorn, W. H. Davis, Albert Dall and C. W. Hopkins.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

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Trade Is Nearly Normal

THERE was a sharp decrease in trade activity in the last two months of the old year, and there has since been a sharp increase. This has left many men in doubt as to where we really stand. There is a wide variety of opinion. At one extreme is the view that, when the previous recession was so impressive, the "recovery", regarding it as such, looks too easy to be trusted. At the other extreme is the view that when already trade is so active much further improvement may be expected.

Such views seem to be based on generalizations rather than upon careful scrutiny of details contained in the statistics. The fact rather seems to be that we have closely approached normal and need neither to fear a secondary reaction nor expect additional large improvement. As to the previous trade recession, one should note that the shock of the stock market collapse came at a time of year when men would be particularly disposed to liquidate and thus the usual process was accentuated. Accordingly one should be careful not to take the trade recession too seriously.

The new year's statistics indicate a very fair degree of activity. Freight car loadings in six weeks are only 6.1 per cent below those in the same period of last year and 2.5 per cent below those in the year before. Bituminous coal production in the six weeks is off from last year but above the year before, and a shade above the mean of the two years. This month's steel ingot production is likely to approximate that of February, 1926, which would put it above any preceding February and only a very few per cent below February of 1927 and 1928, and scarcely 15 per cent under February of 1929, which it was admitted at the time was an exceptional year.

Even the automobile industry is not doing so poorly by a long-range comparison. January production as officially reported last week was 283,477 cars and trucks, United States and Canada, which was 33 per cent under the preceding January but 1 per cent above the January average in the five years previous. It was above January of 1925, 1927 and 1928. It is true, of course, that this year's production is running particularly to light cars, which do not make so much demand for materials, but that indicates buying power on the part of the common people, in whose affairs everyone expresses so much interest.

The Federal Reserve Board's index of industrial production, manufacturing and mining, adjusted for seasonal variation, dropped to such a low level last December as to suggest that it was probably at a low point, ready for recovery this year. Based on 1923-4-5 as 100, it rose to a uniform 109 for February to June, inclusive, in 1928, and the nine-point rise may be taken as in keeping with the growth of the country. Then it mounted month by month to 126 for June, 1929, the crest of a special movement, declining sharply to 99 in December. To bring things back to normal or average, allowing for growth, it should go up to about 113. Probably the figures for this month when compiled will show substantial progress in that direction.

Labor employment is a matter separate from all these quantitative measures of trade activity, for it is affected by another factor, that of mechanization producing "technological unemployment."

The High Cost of Building

THE labor unions report a larger percentage of unemployment than a year ago, especially in the building trades. This might be corrected, with consequent benefit to the production of building materials, if they were less exorbitant in their terms, which they raised last May.

The man who wants to build a house for himself is staggered by the cost, and it is largely the labor cost. The man who owns a house and has to have repairs made is aghast when he gets the bills. We have often wondered how William Green and his subordinate labor leaders view such things in their personal affairs. Are they always benign, never indignant?

An instructive situation in respect to labor is that of the musicians. They rendered themselves impossible to the ordinary theater manager, the extraordinary being the only one who could comply with their terms. Even he did so grudgingly and he substituted mechanical music when invention supplied it. The union appealed for public sympathy by advertisement, but it did not get any. The public would like to have orchestras again in the old-time theaters, wherefore the musicians need not starve.

This turns our mind to the amazing figures of the gross and net earnings of the great amusement companies. They now constitute a class on the New York Stock Exchange and have made colossal fortunes for a group of men who sensed the appetites of the millions and started with nickelodeons and such things. They had, however, a broader perception than the mere desire of the public for entertainment. The high cost of building, and consequently of rent, was destroying the home, especially in the cities. The people could afford only cubicles in which to sleep.

Consequently leisure had to be spent somewhere.

The restaurants became their dining rooms and the cinema palaces their recreation rooms. Hence the evening throng in Broadway. Some economists describe this as an improvement in the scale of living; others describe it as a change in the mode. Anyhow, the high cost of building has a good deal to do with it.

Trends in Metallurgical Education

AT the recent meeting of the American Institute of Mining and Metallurgical Engineers a number of educators discussed the problems of metallurgical education. It developed that the most of the courses available are adjuncts to mining curricula, and the formal instruction pays a disproportionate share of attention to the problems of smelting the ore, as compared with that given to the properties of the commercial metals and the possibilities of modifying them by alloying, working or heat treatment. There appear to be many more opportunities for metallurgists in metal-working or fabricating plants than the schools can supply.

The latter is, of course, due to the sparse registration of students, for instructional capacity is available for many times the present enrollment of metallurgical engineers. No dissent was expressed to the view that the small classes are so because the public generally does not know anything about the metallurgist. Unless and until some vivid personality develops in the metal industry, who can receive the publicity of a Steinmetz or a Goethals, the freshmen presenting themselves to college will be as cold toward the possibilities of metallurgy as they now are. Even in the Pittsburgh-Cleveland region college students working toward electrical, civil or mechanical engineering degrees far outnumber those studying iron and steel.

Nevertheless the faculties in a score or more American institutions are keeping their facilities and curricula in readiness to supply the demand which exists in industry. Much thought is being given toward the degree of specialization and its relation to fundamental subjects. (As a matter of fact the current conception of fundamentals is changing.) Prof. S. L. Goodale, of the University of Pittsburgh, described how his institution had changed in 20 years' time, from a position where it allowed a preponderance of electives in all engineering courses from the second year onward, to its present attitude that the varieties of engineering are so akin that much more work should be done on the common foundation—thus reserving specialization to the last year. In this it approaches the practice in medical schools, which make no effort to train specialists, except as postgraduates. He presented a digest of a large amount of correspondence with leading men in the steel industry which clearly indicated that they, as employers, were more interested in getting young men trained in general science than others who knew a lot about a little.

Whether an institution of "higher learning" can afford to be influenced greatly by the demands of industry (as is, properly, a trade school) is a matter which will bear some discussion. It is encouraging to find that the present trend in education, at least as reflected in this meeting of 40 or 50 teachers, is away from the plan which produces research specialists and toward the plan which is more likely to make young engineers more adaptable to the infinite variety of life and industry.

Wealth and Habits of Living

PUBLICATION by the National Industrial Conference Board of an estimate of the national wealth of the United States in 1928, 360.1 billion dollars, arouses interest on account of the size and scope of the subject. Such interest, however, is merely fleeting, and why? Because nobody is moved to do anything about it.

In considering national affairs the blunder is often made of unconsciously applying the same philosophy to the nation as properly pertains to the individual. The individual frequently, though not always, desires wealth so that he need not work so hard. In actual practice we are quite indisposed to work out such a philosophy for the nation. We do not want this nation to grow rich in the world for the purpose of importing goods instead of making them, having other people work for us, which in essence is the ambition of many individuals who wish to grow rich.

We want what we want when we want it, and if we can get things without national wealth we are so much better off. If, for instance, we can get all the railroad transportation we want with a ten-billion dollar investment in railroads we are better off than if we have to have twenty billions of capital thus tied up.

In the period since just before the war our national wealth has not been increasing nearly so rapidly as in some previous periods. There is good ground for argument that this is an advantage, not a disadvantage. No one doubts that we have been getting along very well on the whole, with rapidly increasing creature comforts and more opportunity to enjoy them.

The history of growth of our national wealth is interesting and can be depicted by a few simple but comprehensive figures. We may disregard totals and consider per capita figures only. The Census statements of wealth are all we have for the past and admittedly are far from exact, but when we compare over long periods of time inaccuracies become of relatively small moment. Selecting periods of as nearly homogeneous character as possible, we have arranged the matter in the following simple form, showing average annual rates of increase in per capita wealth:

	Per Cent
1850 to 1860	5.25
1860 to 1880	2.67
1880 to 1900	1.82
1900 to 1912	4.37
1912 to 1928	2.73

In the last 80 years the period of most rapid growth was 1850 to 1860. The period was, moreover, handicapped by the sharp panic of 1857, but that was largely financial and the ensuing depression was mild relative to those after 1837, 1873 and 1893. From 1860 to 1880 we had the Civil War, then eight years of great activity when people thought they were accomplishing much more than was really the case, then a very severe depression, ended only late in 1879. The influence of commodity prices on the valuation of physical wealth was not important.

There was a slight rise, 1850 to 1860, and another slight rise, about 7 per cent, 1860 to 1880.

It seems remarkable that wealth increased less 1880 to 1900 than in the preceding 20 years, 1.82 per cent a year against 2.67 per cent, but there was a 14 per cent decline in prices against a 7 per cent increase in the preceding period.

Then we come to the remarkable period, 1900 to 1912, when there was a high rate of increase, 4.37 per cent, swelled somewhat by a 23 per cent increase in prices. In the next 16 years the increase averaged only 2.73 per cent, although there was a 40 per cent rise in prices, making a slightly higher rate than the 23 per cent in the preceding 12 years.

The logical conclusion, comparing the wealth figures with what we are actually getting and how we are living, is that from a practical standpoint we have grown more efficient in getting what we want without tying up capital at as rapid a rate as in the past.

CORRESPONDENCE

In Favor of Metric System

To the Editor: An article on the metric system by William E. Bullock, secretary of American Institute of Weights and Measures, New York, in THE IRON AGE, Feb. 20, page 595, seems to the writer to be open to criticism. It is evident that the author is trying to make up a strong case against adoption of the metric system.

He assumes that 150,000 manufacturers in this country would have to spend $20,000 a year for ten years to make the change, which would be $200,000 for each manufacturer. How these figures were arrived at is hard to comprehend, and without question they are greatly exaggerated.

My guess is that it would not cost anywhere near this amount and, assuming that there are 150,000 manufacturers who would be seriously affected by the change, I do not think it will cost each one over $1,000, which would amount to a matter of $150,000,000 in all, whereas Mr. Bullock figures it will cost $30,000,000,000.

In the second paragraph he has 42,000,000 mechanics in the country, and he states that each one will have to spend $230 on an average. Both figures are entirely unjustified. I do not believe that the average mechanic will need to spend more than $25 additional for this change in tools. He then refers to the enormous expense for public schools. The changing of the public schools will be gradual and new books will be bought to replace the old ones, so that there will be practically no extra expense in this connection.

If the proposition is so difficult, how is it that practically 90 per cent of the population of the entire world has adopted this system? Can we really be so conceited as to assume that all these people who made this change did not know what they were doing, and that it is only the United States and Great Britain who have the ideal system of weights and measures?

This country has everything to gain by adopting the metric system, especially when it comes to dealing with foreign countries which have already adopted this system. It has everything to recommend it from a technical point of view.

If countries that have adopted this system have found little or no difficulty in changing over, this country should have little or no trouble doing the same. As far as I know, no country needs to use an army of enforcement agents to see that the system is lived up to. Most broad-minded people, and I believe they are largely in the majority, believe in the adoption of the metric system.

FRANK MOSSBERG,
President, Mossberg Pressed Steel Corporation.
Attleboro, Mass., Feb. 24.

[Our understanding of the main contention against the bills pending in Congressional committees is that they would be in effect force bills, legislating all weights and measures but the metric out of the realm of things legal to use. The metric system has had full legality in the United States since 1866, but relatively few manufacturers have found it suited to their needs, even for export trade.—EDITOR.]

Normalizing Furnaces for Sheet Steel

To the Editor: I have noted with interest your review and comments on my paper entitled "Recent Developments in Normalizing Sheet Steel," recently delivered before the American Society for Steel Treating in New York, and wish to correct certain misunderstandings both in the text and discussion.

In commenting on the article (second column, page 517, THE IRON AGE, Feb. 13) you speak of the chromium steel carrier sheets as being of "a high heat conductivity . . . expensive . . . and require considerable labor to handle at the furnace."

My comments have evidently been misinterpreted, as chromium sheets are of relatively low heat conductivity and possess the power to absorb and dissipate heat uniformly to the full finished sheets being heat treated on these carriers. Furthermore, such chromium or chrome-nickel carriers are less expensive in the long run than steel carriers, providing the right grade of alloy carrier is utilized, which is dependent on the mode of operation and the fuel used in the normalizer. There is no legitimate excuse for the handling of chromium carriers to be more costly at a normalizer than steel sheets, and observation of various normalizers using alloy carriers point to less labor for handling, as they are much lighter in gage and easier to handle.

With reference to the remarks in the third column of page 517, the mere fact that box or discontinuous annealing appears logical in a discontinuous processing mill does not prohibit the use of continuous heat treatment. We grant you the point that it is a logical and common sense step to install continuous annealing in a continuous mill, to which you make reference, but you will find that continuous heat treatments (particularly normalizing of sheet) are widely used in sheet mills where its other processing steps are non-continuous. In fact, it may be said that it is necessary, in view of the fact that normalizing is not commercially possible in box annealing furnaces of the present type.

The welding together of sheets to form a continuous strip, while possible, is costly both from the standpoint of lost time and loss of metal by subsequent trimming, and would show no outstanding advantage where roller type normalizers are concerned. If the material is to be dragged through the furnace, then the full finished sheet must be eliminated. The majority of continuous normalizers in sheet mills today must utilize conveyor mechanisms that not only contribute to the uniformity of heat treatment, but to the surface of the sheet as well.

In the light of the late developments in heat treatment, I am of the sincere opinion that no progressive sheet manufacturer using discontinuous methods of manufacture will honestly believe that box annealing is logical and that continuous normalizing of his product is out of place in his processing equipment.

EDWARD S. LAWRENCE,
Furnace Division, Duraloy Co., Pittsburgh.

Fabricated Steel Plate Orders Sharply Up

WASHINGTON, Feb. 25.—Making an increase of 111 per cent, orders for fabricated steel plate in January totaled 49,468 tons, representing 62.9 per cent of the capacity of the 48 firms reporting to the Department of Commerce, against 23,535 tons, or 29.9 per cent of capacity in December.

January orders were distributed as follows: Oil storage tanks, 7432 tons; refinery materials and equipment, 6253 tons; tank cars, 17,313 tons; gas holders, 2868 tons; blast furnaces, 1042 tons; and stacks and miscellaneous, 14,560 tons.

International Double Taxation Discussed

WASHINGTON, Feb. 21.—The Treasury Department will recommend Congressional action for solution of the problem of international double taxation. This course was determined upon at a meeting here last week of Government officials, industrial interests and tax experts of the country. The proposed legislation will take the form of granting to foreign capital exemption from taxation on investments in the United States in return for a like privilege to American investments in foreign countries. The conference was called at the suggestion of Secretary of the Treasury Mellon, who pointed out the great importance of eliminating international double taxation, which has proved a burden to American capital with enormous investments abroad. The position of the Treasury was made clear by Under-secretary Ogden Mills, who informed the conference that the department favored the principle of "exempting the yield of investment capital from taxation in the country of investment and taxing it only in the country of residence of the investor." The conference reflected the opinion that foreign governments would cooperate to this end and that therefore the Treasury suggestion should be made a matter of legislation.

High-Grade Manganese by Flotation

WASHINGTON, Feb. 20.—Experimentation last year at the Rolla, Mo., station of the United States Bureau of Mines indicated that certain manganese metals could be successfully separated from accompanying vein rock by flotation methods. Tests on a commercial scale in the Anaconda concentrator of the Anaconda Copper Mining Co. has verified the laboratory findings. According to information furnished by American Manganese Producers Association, 300 tons of rhodochrosite ore from the Emma mine, Butte, Mont., containing about 30 per cent manganese and over 20 per cent silica, are being treated daily and a concentrate produced averaging about 39 per cent manganese and under 6 per cent silica. Manganese recovery has averaged about 95 per cent. The fines are sintered into nodulized material averaging 60.8 per cent manganese and 6.9 per cent silica. More than 5000 tons of this product, quite suitable for the manufacture of ferromanganese has been made during January and February.

The Week in Business

Drift of Current Financial and Economic Opinion

STUDENTS of business conditions are now pretty generally trying to square the uptrend in steel production with the downtrend shown by most other indicators of industrial activity. The result is a wave of somewhat pessimistic utterances. Some of these are in substance as follows:

Now Stress Negative Features

The credit situation has not been entirely corrected; the readjustment has latterly not been so rapid as in late 1929. A further curtailment of loans is believed necessary before there can be a broad expansion of business without at the same time a renewed advance in interest rates. The fact that bond prices have not fully recovered is taken to prove that credit conditions are not yet ripe for the hoped for sustained recovery in business.

Inventories of manufacturers and dealers may not be excessive, but consumers have comfortable supplies; a revival in demand, says the Alexander Hamilton Institute, generally requires from 6 to 12 months.

The decline of commodity prices, itself responsible for checking purchases, will not be halted, it is held, until needs accumulate and an easier credit stimulates increased buying, and this is not likely before the last half of 1930.

If the volume of automobile buying is expected not to surpass that of 1928, there is no point in looking for monthly outputs in excess of the production of corresponding months two years ago.

Again quoting the Alexander Hamilton Institute, exports of American manufactures this year are expected to fall off at least 15 per cent from those of 1929. One important factor, aside from that fact that the current recession is world wide, is that there will likely be a decidedly further drop in American investments in foreign securities.

It remains that the recovery is not belittled. Instead it is pointed out that the slump in demand was proved to be less serious than the drop in manufacturing activity indicated. Yet, nothing earlier than May, for business to reach the normal, is now forecast. Such for example was the conclusion of statisticians in industry in a regular monthly conference held under the auspices of the National Industrial Conference Board.

If there is wider acceptance of the idea that the attainment of normal is further in the future than was suggested by market students a month ago, it remains that they do not disclaim that business is not still on the upgrade, although the impression is left that the grade is hardly steep.

Contrary movements of prices and production are not exceptional in circumstances like the present, says the Harvard Economic Society, for after a setback activity must increase before commodity prices can improve. Alexander D. Noyes, in the New York *Times*, reiterates that we still have to be thankful that there was no mercantile and industrial speculation while the stock market was running wild.

Asks Patience in Farm Price Handling

Conspicuous amid the flood of condemnation of the price stabilization procedure of the Federal Farm Board is a plea of the Guaranty Trust Co., New York, that the newly adopted marketing system should be given a fair opportunity to manifest itself. The system is not yet fully organized, it emphasizes, and the policies of the board are in the formative stage. "The board has undertaken an extremely difficult, perhaps an impossible, task," and "harassing it further by premature cries of failure will accomplish nothing except to increase the already great pressure upon it to resort to drastic and unsound methods."

Iron and Steel Markets

Automotive Specifications Decline

Production Tapers in Some Centers But Advances to 95 Per Cent at Chicago—Mills Take Firmer Attitude on Prices

STEEL demand has tapered, mainly because of smaller specifications from the automobile industry, but average ingot production continues at a good rate, with no sharp recession in early prospect.

Although steel makers specializing in automobile steels have been forced to curtail operations, other producers are holding their own or further expanding output.

The ingot rate at Chicago, influenced by releases of pipe steel, has risen from 90 to 95 per cent of capacity, and Alabama operations average 94 per cent. On the other hand, output in Pittsburgh and the Valleys has receded from 80 to 75 per cent. Raw steel production for the country at large is estimated at 80 per cent, compared with 82 per cent a week ago, while the rate of Steel Corporation plants remains unchanged at 85 per cent.

A more conservative viewpoint prevails in the steel trade than a month ago, following the spectacular recovery of buying in January. Certain estimates now place automotive consumption of steel this year at only 60 per cent of that of 1929, but until the arrival of open weather gives definite indications of the volume of retail demand for cars all calculations must be regarded as mere conjectures. Ultimate consumer purchases are particularly difficult to anticipate in view of the unsettled business situation that has prevailed since the stock market crash. In adhering to a cautious policy, motor car makers are trying to avoid the danger of overproduction.

To the uncertainties as to automotive steel requirements have been added contingencies that may affect the flow of steel to the building industry and farm equipment plants. President Hoover's pleas to Congress for economy, while understandable as a check on pork barrel legislation, have raised doubts as to the extent of the Government's public works program which had been counted on to stimulate business activity later in the year. The recent declines in wheat and cotton prices have also caused concern for the future, although the manufacture of agricultural machinery has not yet been affected.

While the long view has become more obscure, prospects for the next month or two are regarded as good. The approach of spring is bringing out larger specifications in wire products and tin plate and contracts for outdoor work, such as pipe laying and highway building. Road construction in Iowa calls for 25,000 tons of reinforcing steel, of which 10,000 tons has been placed. Pipe line contracts are commencing to draw steel from the mills and are likely to result in much heavier specifications in coming weeks. Fully 3000 miles of pipe lines are pending, including an oil line from the Atlantic seaboard to Cleveland and a gas line from Texas to Chicago. The contract for the latter was actually placed last fall, but specifications were suspended over the winter and it is now proposed to lay two lines instead of one, increasing the plate requirements to 250,000 tons.

Railroads, fabricators, shipyards and farm equipment plants continue to take steel at a high rate. The carriers have placed numerous supplementary rail orders, calling for 1000 to 3000 tons each, swelling the backlogs of rail mills. Freight equipment purchases thus far this year have exceeded those for the same period in 1929 by 1000 cars. Railroad steel now accounts for 38 per cent of the total production of a leading steel interest.

The confidence of the industry in the immediate future is reflected in a firmer attitude on prices. Plates still show weakness in certain markets, but structural shapes are steadier and bars are firm. Irregularities in steel sheets are tending to disappear, and black sheets are more commonly quoted for current business at 2.65c., Pittsburgh, or $1 a ton over the recent minimum. For second quarter a number of sheet mills have opened their books at 2.75c. Several makers of automobile body sheets have announced a reduction of 10c. per 100 lb. in extras for widths ranging from 36 to 48 in.

Wire rods, after being subject to widespread shading, are now openly quoted by some producers at $39 a gross ton, Pittsburgh.

Scrap markets have an easier tone at Chicago and at Pittsburgh, particularly in the latter center, where fresh demand from the mills has subsided and inspection of shipments has become more rigid. Heavy melting steel has declined 50c. at Pittsburgh, but has advanced an equal amount at Philadelphia.

Pig iron melt has shown no increase since January, except possibly in the Chicago district. Buying has been mainly for early requirements, making it difficult for furnaces to accumulate a backlog. In some instances producers have been forced to add to their stock piles. Competition is severe, with Alabama foundry iron dipping to $13 and $12.50, Birmingham, on business in distant markets and with Northern furnaces finding it more difficult to maintain their prices. A downward revision of Chicago pig iron prices is mentioned as a possibility.

THE IRON AGE composite price for finished steel has advanced from 2.305c. to 2.312c. a lb. The pig iron composite has declined from $18 to $17.92 a ton, the lowest figure since 1928.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	Feb. 25, 1930	Feb. 18, 1930	Jan. 28, 1930	Feb. 26, 1929
No. 2 fdy., Philadelphia	$20.76	$20.76	$20.76	$21.26
No. 2, Valley furnace	18.50	18.50	18.50	17.50
No. 2, Southern, Cin'ti	*16.69*	17.19	17.69	20.19
No. 2, Birmingham	**15.00**	14.50	14.50	16.50
No. 2 foundry, Chicago*	20.00	20.00	20.00	20.00
Basic, del'd eastern Pa.	*19.25*	19.50	19.50	20.25
Basic, Valley furnace	18.50	18.50	18.50	17.50
Valley Bessemer, del'd P'gh	20.76	20.76	20.76	20.01
Malleable, Chicago*	20.00	20.00	20.00	20.00
Malleable, Valley	19.00	19.00	19.00	18.00
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	94.00	94.00	100.00	105.00
Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	33.00	33.00	34.00	34.00
Sheet bars, Pittsburgh	33.00	33.00	34.00	35.00
Slabs, Pittsburgh	33.00	33.00	34.00	34.00
Forging billets, Pittsburgh	38.00	38.00	39.00	39.00
Wire rods, Pittsburgh	*39.00*	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.90
Finished Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.85	1.85	1.85	1.90
Bars, Chicago	1.95	1.95	1.95	2.05
Bars, Cleveland	1.85	1.85	1.85	1.90
Bars, New York	2.19	2.19	2.19	2.24
Tank plates, Pittsburgh	1.80	1.80	1.80	1.90
Tank plates, Chicago	1.95	1.95	1.95	2.05
Tank plates, New York	2.07½	2.07½	2.02½	2.17½
Structural shapes, Pittsburgh	1.80	1.80	1.80	1.90
Structural shapes, Chicago	1.95	1.95	1.95	2.05
Structural shapes, New York	2.04½	2.04½	2.04½	2.14½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.30
Hot-rolled strips, Pittsburgh	1.80	1.80	1.80	1.80
Cold-rolled strips, Pittsburgh	2.65	2.65	2.65	2.85

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel,	Feb. 25, 1930	Feb. 18, 1930	Jan. 28, 1930	Feb. 26, 1929
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 24, P'gh	**2.65**	2.60	2.60	2.85
Sheets, black, No. 24, Chicago dist. mill	2.75	2.75	2.75	2.95
Sheets, galv., No. 24, P'gh	3.30	3.30	3.30	3.60
Sheets, galv., No. 24, Chicago dist. mill	3.40	3.40	3.40	3.70
Sheets, blue, No. 13, P'gh	2.25	2.25	2.25	2.20
Sheets, blue, No. 13, Chicago dist. mill	2.35	2.35	2.35	2.30
Wire nails, Pittsburgh	2.25	2.25	2.30	2.65
Wire nails, Chicago dist. mill	2.35	2.35	2.35	2.70
Plain wire, Pittsburgh	2.40	2.40	2.40	2.50
Plain wire, Chicago dist. mill	2.45	2.45	2.45	2.55
Barbed wire, galv., Pittsburgh	2.95	2.95	2.95	3.30
Barbed wire, galv., Chicago dist. mill	3.00	3.00	3.00	3.35
Tin plate, 100-lb. box, P'gh	$5.25	$5.25	$5.25	$5.35
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	*$16.50*	$17.00	$16.50	$18.50
Heavy melting steel, Phila.	**15.00**	14.50	14.50	16.00
Heavy melting steel, Chicago	13.50	13.50	12.75	15.75
Carwheels, Chicago	15.00	15.00	14.00	14.50
Carwheels, Philadelphia	15.00	15.00	15.00	16.50
No. 1 cast, Pittsburgh	14.50	14.50	14.50	15.00
No. 1 cast, Philadelphia	15.00	15.00	15.00	16.50
No. 1 cast, Ch'go (net ton)	14.00	14.00	13.50	16.00
No. 1 RR. wrot., Phila.	15.00	15.00	15.00	16.00
No. 1 RR. wrot., Ch'go (net)	12.25	12.25	12.00	14.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.60	$2.60	$2.50	$3.00
Foundry coke, prompt	3.50	3.50	3.50	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	18.12½	18.12½	18.12½	18.37½
Electrolytic copper, refinery	17.75	17.75	17.75	18.25
Tin (Straits), New York	*38.12½*	38.75	39.37½	48.87½
Zinc, East St. Louis	*5.15*	5.20	5.30	6.35
Zinc, New York	*5.50*	5.55	5.65	6.70
Lead, St. Louis	6.10	6.10	6.10	6.90
Lead, New York	6.25	6.25	6.25	6.95
Antimony (Asiatic), N. Y.	**9.00**	8.75	8.87½	9.37½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

More Restrained Buying of Steel Indicates Further Gains

May Come Somewhat More Slowly

PITTSBURGH, Feb. 25.—With steel consumption apparently settling to a steadier if less spectacular rate than that which characterized it at the beginning of the year, February is coming to a close with Pittsburgh district companies viewing conditions in a more conservative light. The recovery of business during January exceeded expectations and perhaps aroused a little too much optimism. However, the more restrained buying of steel in the last three or four weeks has been exceedingly healthy.

Companies which stepped up production too rapidly late in January have now retrenched somewhat, although the aggregate activity of the industry has been maintained and perhaps increased slightly by the more gradual expansion in the production by the larger makers of diversified lines of steel products. The daily rate of specifications of some producers in February will fall slightly behind those of the preceding month. Nevertheless it is certain that shipments have gone immediately into consumption and, so long as steel consumers continue to exercise the restraint which characterizes their present buying policies, producers may be assured that further business gains may be of a more permanent nature than were the rapid increases of January.

The coming of warmer weather always brings impetus to business from the widely scattered fields of activity, none more important, perhaps, than the automobile industry. It is well known that automobile producers have never been more careful to restrict their production to actual current demand for cars, and it is impossible for them to gage the probable extent of consumer purchases before the coming of open weather. Consequently, February production has been rather limited, notably among makers of cars in the medium and high price field, and March schedules are not expected to show any sharp upward turn, at least, not until the latter part of the month.

The approaching spring has already brought promise to the steel industry with the revival of a number of large pipe line projects which are likely to be placed early in the second quarter. Pittsburgh mills are preparing to bid on a line from the Texas Panhandle into the Chicago district that first came to attention last fall, and makers of small diameter tubing expect the proposed pipe line extending across Pennsylvania, which the Sun Oil Co. is undertaking, to consume 20,000 to 25,000 tons of steel. Less definite information about other projected pipe lines is available.

Structural work in the Pittsburgh district has not yet become active, but mills are sharing in the large orders placed in other parts of the country, and local fabricating shops, especially the larger ones, have fair-sized backlogs.

Price weakness continues in some lines, but mills are now making determined efforts to maintain present

quotations, and advances of $2 a ton on black and galvanized sheets are planned for the second quarter. The 1.85c. Pittsburgh quotation on bars, shapes and plates is gaining strength, even though it now represents the usual maximum figure asked by mills. Strip steel quotations are holding and those on cold-finished steel bars are being maintained.

Slight curtailment in the operations of mills that had increased production more rapidly than demand warranted is giving the price situation more stability, as such producers have generally recognized the futility of maintaining production at the expense of prices.

The pig iron market continues dull and scrap has weakened in the face of a temporary lack of mill buying and a more plentiful supply of No. 1 heavy melting steel in the Pittsburgh district. Although mills are not actually holding up shipments at any consuming points, they are restricting consignments by means of more than usually rigid inspection and not a little distress material is available. The coke market is somewhat stronger.

Semi-Finished Steel—Shipments of billets, slabs and sheet bars to non-integrated users have not increased very much in the last few weeks, but have become rather steady, and generally represent a 75 per cent operating rate by consuming companies. Exception might be made in the case of one or two makers of tin plate who have an outside source for their raw steel and are running at a high rate. Spot buying is negligible, although a few sales of billets at $33, Pittsburgh, are reported. Forging billets have been sold at $38. Spot sales of wire rods are being made occasionally at $39 to $40, and the current market is quotable at that range. Some large contract buyers have covered at $38.

Pig Iron.—No buying of importance has been reported in the last week and the market is supported solely by sales of small lots for immediate shipment. Shipments against contracts in February will show little improvement over the previous month, and some merchant makers will add tonnage to their stock piles. One large producer nevertheless will ship several thousand tons more than it made during February, partly because of the rather large requirements of one or two of its contract customers. New inquiry is negligible. With users of pig iron pursuing a cautious policy, no buying movement seems to be in sight. Prices lack the strength which would be given by even a single purchase of a significant tonnage, but sales of small lots continue to bring $18.50, Valley, for foundry and basic and $19 for malleable and Bessemer.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phos., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

Bars, Shapes and Plates.—Specifications are holding up rather steadily, although the daily average this month is slightly behind January with some companies. This is especially true of plates and shapes, while heavier movement in bars is reported in some quarters. The Pittsburgh district is not contributing much to the heavy volume of structural tonnage which is being placed throughout the country. Large fabricating shops in this district have ample backlogs, but their shipments are heavy and in recent weeks new contracts taken have fallen considerably behind outgoing tonnage. The smaller shops have been rather badly in need of tonnage for some time, but the coming of warmer weather will undoubtedly stimulate activity for them. Shape mills are maintaining a comparatively high rate of operation, and are considerably better occupied than plate and bar units. Bar mills are not averaging better than 65 per cent of rated capacity, with plate mills at a slightly higher rate. Shipments of plates to railroad car builders have improved slightly, but are not yet up to expectations. Buying of barges has been very light thus far in the year, although orders for four units, taking about 400 tons of steel, have been placed recently. The Standard Unit Navigation Co. is expected to ask for bids this week on 60 small barges for Mississippi and Ohio River service. Prices on the heavy hot-rolled products are becoming fairly well stabilized at 1.85c., Pittsburgh. The 1.90c. quotation has just about disappeared, and the 1.80c. price on plates and shapes, which was fairly common on large tonnages a short time ago, is also being withdrawn.

Rails and Track Supplies.—New buying is light, but specifications for track accessories are fairly good. Rail mill operations are approaching capacity, but weather conditions in some parts of the country still preclude extensive rail laying programs. Prices on track accessories are not being tested regularly, but are nominally holding at recent figures.

Tubular Goods.—Demand for the smaller sizes of seamless and welded tubing has shown a marked increase in the last few weeks, although large diameter material is still very quiet. Market interest is centered in large pipe line projects, which seem to be more active, although no definite inquiries on any of these jobs have come before the trade. The oil carrying line to be built across Pennsylvania from Marcus Hook, Pa., by the Sun Oil Co. will probably take 6-in. material, and will require from 20,000 to 25,000 tons of pipe, according to present estimates. The projected gas line from the Texas Panhandle district to Chicago is again getting attention, although none of the important details have yet been worked out. Two or three other large projects have been mentioned, but are not far enough along to demand immediate attention.

Wire Products. — Merchant wire products are still very dull, although movement of bright hard wire to the manufacturing trade is considered satisfactory. Shipments of barbed wire

THE IRON AGE Composite Prices

Finished Steel

Feb. 25, 1930, 2.312c. a Lb.

One week ago	2.305c.
One month ago	2.305c.
One year ago	2.391c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High	Low
1930	2.362c., Jan. 7;	2.305c., Jan. 28
1929	2.412c., April 2;	2.362c., Oct. 29
1928	2.391c., Dec. 11;	2.314c., Jan. 3
1927	2.453c., Jan. 4;	2.293c., Oct. 25
1926	2.453c., Jan. 5;	2.403c., May 18
1925	2.560c., Jan. 6;	2.396c., Aug. 18

Pig Iron

Feb. 25, 1930, $17.92 a Gross Ton

One week ago	$18.00
One month ago	18.17
One year ago	18.38

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High	Low
1930	$18.21, Jan. 7;	$17.92, Feb. 25
1929	18.71, May 14;	18.21, Dec. 17
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1
1926	21.54, Jan. 5;	19.46, July 13
1925	22.50, Jan. 13;	18.96, July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.85c.
F.o.b. Chicago	1.95c. to 2.00c.
Del'd Philadelphia	2.17c. to 2.22c.
Del'd New York	2.19c. to 2.24c.
Del'd Cleveland	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Lackawanna	2.00c.
F.o.b. Birmingham	2.00c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	1.95c.
F.o.b. Pittsburgh mills, cut lengths	2.20c.
F.o.b. Birmingham, mill lengths	2.00c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.80c. to 1.90c.
F.o.b. Chicago Heights mill	1.85c.
Del'd Philadelphia	2.12c. to 2.22c.

Iron

Common iron, f.o.b. Chicago	1.95c. to 2.00c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.80c. to 1.85c.
F.o.b. Chicago	1.95c. to 2.00c.
F.o.b. Birmingham	2.00c.
Del'd Cleveland	1.99c. to 2.04c.
Del'd Philadelphia	2.00c. to 2.05c.
F.o.b. Coatesville	1.90c. to 1.95c.
F.o.b. Sparrows Point	1.90c. to 1.95c.
F.o.b. Lackawanna	1.90c. to 1.95c.
Del'd New York	2.07½c. to 2.12½c.
C.i.f. Pacific ports	2.25c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.80c. to 1.85c.
F.o.b. Chicago	1.95c. to 2.00c.
F.o.b. Birmingham	2.00c.
F.o.b. Lackawanna	1 90c. to 1.95c.
F.o.b. Bethlehem	1.90c. to 1.95c.
Del'd Cleveland	2.04c.
Del'd Philadelphia	1.86c. to 2.01c.
Del'd New York	2.04½c. to 2.09½c.
C.i.f. Pacific Ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.90c.
Wider than 6 in., P'gh	1.80c.
6 in. and narrower, Chicago	2.10c.
Wider than 6 in., Chicago	2.00c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.65c. to 2.75c.
Strips, Cleveland	2.65c. to 2.75c.
Strips, del'd Chicago	2.95c.
Strips, Worcester	2.80c. to 2.90c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.00c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Merchant Trade

	Base per Keg
Standard wire nails	$2.25 to $2.30
Cement coated nails	2.30
Galvanized nails	4.30

	Base per Lb.
Polished staples	2.75c.
Galvanized staples	3.00c.
Barbed wire, galvanized	2.95c.
Annealed fence wire	2.45c.
Galvanized wire, No. 9	2.90c.
Woven wire fence (per net ton to retailers)	$65.00

To Manufacturing Trade

Bright hard wire, Nos. 6 to 9 gage	2.40c.
Spring wire	3.50c.

(Carload lots, f.o.b. Chicago)

Wire nails	$2.35 to $2.45 (keg)
Annealed fence wire	2.50c. to 2.60c. (lb.)
Bright hard wire to manufacturing trade	2.45c.

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.55 to $2.60
Less carloads, Wheeling or Reading	2.70

Light Plates

No. 10, blue annealed, f.o.b. P'gh	2.10c.
No. 10, blue annealed, f.o.b. Chicago dist.	2.20c.
No. 10, blue annealed, del'd Phila.	2.42c.
No. 10, blue annealed, B'ham	2.25c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.25c.
No. 13, f.o.b. Chicago dist.	2.35c.
No. 13, del'd Philadelphia	2.57c.
No. 13, blue annealed, B'ham	2.50c.

Continuous Mill Sheets

No. 10 gage, f.o.b. P'gh	1.90c. to 2.00c.
No. 13 gage, f.o.b. P'gh	2.00c. to 2.15c.

(Usual range 24 in. to 48 in. wide)

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.65c.
No. 24, f.o.b. Chicago dist. mill	2.75c. to 2.85c.
No. 24, del'd Philadelphia	2.97c.
No. 24, f.o.b. Birmingham	2.90c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh	3.90 c. to 4.00c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.30c. to 3.40c.
No. 24, f.o.b. Chicago dist. mill	3.40c. to 3.50c.
No. 24, del'd Cleveland	3.49c. to 3.59c.
No. 24, del'd Philadelphia	3.62c. to 3.72c.
No. 24, f.o.b. Birmingham	3.45c. to 3.50c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.90c. to 3.00c.
No. 28, f.o.b. Chicago dist. mill	3.00c. to 3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	3.90c.

Long Ternes

No 24, 8-lb. coating, f.o.b. mill	3.90c. to 4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.70
15-lb. coating I.C.	13.40
20-lb. coating I.C.	14.60
25-lb. coating I.C.	$15.90
30-lb. coating I.C.	16.80
40-lb. coating I.C.	18.80

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1¼% Nickel)	$0.25
2100	(1½% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molydenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 (Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plate, steel	2.07½
Angle bars	$2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	15
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ and ⅜	+13	+48
½	53	42½	½	22	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 2	34	18

Lap Weld, extra strong, plain ends

2	53	42½	½	39	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2½ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

and fencing to the South and Southwest are beginning to pick up, although jobbers in that territory pursue a hand-to-mouth buying policy, and it is too early in the year to expect a heavy movement. Manufacturers' wire is still quotable at 2.40c., Pittsburgh, and this price is said to be holding on the general run of business. Nails are generally quotable at $2.30 to the trade, with jobbers paying $2.25. Business is much too limited to give these figures an adequate test.

Sheets.—Demand for sheets continues to be rather spotty. Last week brought only fair specifications, following a similar period of more than usual activity. February schedules of some automobile makers have been revised downward, and many companies are not planning a significant increase in output for March. The schedule of the Ford Motor Co. calls for slightly more than 6000 cars daily, a quota which will not likely be changed before the middle of March. However, production during February will hardly average this high. Other sheet users are taking steel steadily, but most of them are still cautious in ordering out tonnage. Manufacturers of office equipment have increased production, bringing slight improvement to the business of metal furniture sheet makers. Sheet prices are gaining strength. Leading makers of black and galvanized material will advance their quotations $2 a ton for second quarter business, and all the larger sheet makers have now withdrawn quotations of less than 2.65c. on black sheets, 3.30c. on galvanized, and 2.25c. and 2.10c. on blue annealed sheets and light plates. These figures do not apply to material made on continuous mills, on which the general quotations are 2.05c. and 1.90c. Several makers of automobile body sheets are announcing reduction of about 10c. per 100 lb. in the width extras of full finished sheets ranging from 36 to 48 in. in width. The narrower sizes are not affected. Automobile body sheets are quotable at 3.90c., Pittsburgh, and metal furniture material at 3.90c. to 4c. Tin mill black plate is still holding nominally at 2.90c. to 3c. Sheet mill operations average about 75 per cent of capacity.

Strip Steel. — Specifications are holding their own, although little increase in incoming tonnage has developed in the last few days. Hot-rolling mills are running at about 65 to 70 per cent of capacity, and cold-rolling mills at about 40 per cent. Automotive demand is spotty, but well maintained in the case of some makers. Hardware manufacturers are still running slowly. Strip prices are fairly well stabilized at 2.65c., Pittsburgh, for cold-rolled material, and 1.80c. and 1.90c. for hot-rolled.

Cold-Finished Steel Bars.—Business continues quiet, with demand fairly well diversified, but not particularly active in any specific consuming group. Farm implement makers are running at a good rate, but the automobile makers still leave something to be desired. Aggregate demand during February has been approximately equal to the previous month's average. The price is holding at 2.10c., Pittsburgh.

Bolts, Nuts and Rivets.—Demand is fair, with market interest centered chiefly upon prices, which have shown some weakness in the last few weeks. Operations average 50 to 60 per cent of capacity. Jobbers' stocks are ample and buying from that source is light. However, railroad equipment makers are taking fairly large tonnages and the automobile industry is gradually increasing its requirements. The quoted prices are unchanged at 70 per cent off list for bolts and nuts, 70 and 10 for small rivets and $3.10 per 100 lb. for large rivets.

Coke.—The coke market is still quiet, but large consumers are beginning to show interest in their annual contracts and a few dealers have taken some of this business. Spot sales are being made at $2.60, Connellsville, and this price is now rather strong. Heating coke is dull, with prices weak. Shipments of foundry coke have now reached fairly satisfactory proportions and prices are being maintained. The premium brands are holding at $4.85, ovens.

Old Material.—Lack of mill buying of heavy melting steel and restricted shipments at a number of consuming points have given the market a distinctly weaker tone in the last week. Ordinary No. 1 scrap is rather plentiful, and mills show no disposition to buy. However, dealers are making no effort to push sales at the present level, and definite offers to mills are not numerous. Dealers are paying from $16 to $16.75 to cover recent orders, and the $17 price, which was paid up until recently to cover at one mill, has not disappeared. In view of this, the market is fairly quotable at $16.25 to $16.75, the latter price representing the most any mill would have to pay today for ordinary No. 1 steel and the lower figure an average dealers' buying price. Hydraulic compressed sheets have been sold in a fairly large tonnage at $16.50, although some buyers claim to have had offers at $16.25. Other grades of scrap are also weaker, although specialties have retained recent strength fairly well. Weakness is also reflected in the blast furnace grades.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$16.25 to $16.75
No. 2 heavy melting steel	14.50 to 15.00
Scrap rails	15.50 to 16.00
Compressed sheet steel	16.00 to 16.50
Bundled sheets, sides and ends	14.00 to 14.50
Cast iron carwheels	14.50 to 15.00
Sheet bar crops, ordinary	18.00 to 18.50
Heavy breakable cast	12.00 to 12.50
No. 2 railroad wrought	16.75 to 17.25
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	11.00 to 11.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	20.50 to 21.50
Railr. coil and leaf springs	20.50 to 21.50
Rolled steel wheels	20.50 to 21.50
Low phos. billet and bloom ends	21.50 to 22.50
Low phos. mill plates	20.00 to 21.00
Low phos. light grades	20.00 to 21.00
Low phos. sheet bar crops	21.00 to 22.00
Heavy steel axle turnings	14.00 to 14.50
Electric Furnace Grades:	
Low phos. punchings	18.50 to 19.50
Hvy. steel axle turnings	14.00 to 14.50
Blast Furnace Grades:	
Short shoveling steel turnings	11.50 to 12.00
Short mixed borings and turnings	11.00 to 11.50
Cast iron borings	11.00 to 11.50
Rolling Mill Grades:	
Steel car axles	20.50 to 21.50
Cupola Grades:	
No. 1 cast	14.00 to 15.00
Rails 3 ft. and under	18.50 to 19.50

Detroit Scrap Steady

DETROIT, Feb. 25.—There have been no changes in prices on old material in the district during the past week. Some reductions in the tonnage produced have occurred, due to changes in automotive schedules.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$12.00 to $12.50
Borings and short turnings	9.00 to 9.50
Long turnings	8.00 to 8.50
No. 1 machinery cast	11.25 to 11.75
Automotive cast	12.00 to 13.00
Hydraul. comp. sheets	11.75 to 12.25
Stove plate	9.00 to 9.50
New No. 1 busheling	11.00 to 11.50
Old No. 1 busheling	8.75 to 9.25
Sheet clippings	9.00 to 9.50
Flashings	11.00 to 11.50

The annual sales conference of Paul Maehler Co., Chicago, maker of Maehler ovens and universal heaters, was held Jan. 28 at the Midwest Athletic Club. Sales representatives from throughout the country discussed the sales and advertising budget outlined by the company for this year. Production facilities have been increased and a more active year than 1929, which was the largest in the company's history, is expected.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.80c. to 2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.60c.
Galv. sheets (No. 24), 25 or more bundles	4.25c.
Light plates, blue annealed (No. 10), 1 to 24 plates	3.25c.
Blue annealed sheets (No. 13), 1 to 24 sheets	3.40c.
Galv. corrug. sheets (No. 28), per square	4.13c.
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black, soft ann'l'd, base per 100 lb	$2.75 to 2.85
Wire, galv. soft, base per 100 lb.	3.20 to 3.30
Common wire nails, per keg	2.60 to 2.75
Cement coated nails, per keg	2.65 to 2.80

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in. Pittsburgh	$33.00
Rerolling, 4-in. and under 10-in., Youngstown	33.00
Rerolling, 4-in. and under 10-in., Cleveland	33.00
Rerolling, 4-in. and under 10-in., Chicago	34.00
Forging quality, Pittsburgh	38.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$33.00
Youngstown	33.00
Cleveland	33.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$33.00
Youngstown	33.00
Cleveland	33.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$39.00 to $40.00
Cleveland	39.00 to 40.00
Chicago	41.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Adgerian	12.00c.
Iron ore, low phos., Swedish, average 68% iron	12.00c.
Iron ore, basic Swedish, average 65% iron	10.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	30.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	30.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$15.50 to $16.50

	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantc seaboard	$22.00 to $24.00

	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.60
Foundry, f.o.b. Connellsville prompt	$3.50 to 4.75
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in. f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$94.00 to $99.00
Foreign, 80%, Atlantic or Gulf port, duty paid	94.00 to 99.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton
10% $30.00	12%	$34.00
11% 32.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton
6% $22.00 to $23.00	10%	$26.00 to $28.00
7% 23.00 to 24.00	11%	28.00 to 30.00
8% 24.00 to 25.00	12%	30.00 to 32.00
9% 25.00 to 26.00		

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd	$1.40 to $1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.25 to 18.75
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Stove bolts in packages, P'gh.	75, 20, 10 and 5
Stove bolts in packages, Chicago.	75, 20, 10 and 5
Stove bolts in packages, Cleveland.	75, 20, 10 and 5
Stove bolts in bulk, P'gh.	75, 20, 10, 5 and 2½
Stove bolts in bulk, Chicago.	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland.	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

No Further Gain in Steel Volume, but Producers Have Comfortable Backlogs—Talk of Higher Prices

CHICAGO, Feb. 25.—The Chicago iron and steel market remains stationary as gaged by the volume of sales and specifications in the past week. Both were slightly above the average in the previous two weeks. Incoming business is still well diversified, though operations at various mill units are less uniform than a week ago. This is indicated by present promises of deliveries on heavy tonnage products. Shipments can be made from some bar mills in two weeks, while on others six weeks still holds. Plates and shapes may be had in three to six weeks in the more common sizes. A few tentative inquiries for second quarter have come to producers. These seem to be urged more by interest in probable quotations for second quarter delivery than by a definite desire to cover for consumption after the end of March.

Irregularities still occur occasionally in the wire products market. Chicago steel producers have in several instances met a price of 1.90c. a lb., Chicago, for attractive plate tonnages which were being sought by producers from other districts. On the other hand, serious thought is being given to the opening of second quarter books on sheets at $2 a ton above present quotations.

Both orders and inquiries from oil producing sections of the country are encouraging. Several small orders for gas line pipe have been placed, and a long 6-in. oil line is in prospect. Pending business in plates for oil storage tank construction is impressive at over 36,000 tons, much of which, it is expected by the trade, will eventually reach local mills.

It is now proposed to lay two gas lines from the Southwest to Chicago, thereby increasing the tonnage on a contract held by the A. O. Smith Corporation to 250,000 tons. There is also talk of a gas line extension from Omaha, Neb., to Minneapolis, Minn.

Chicago sellers of steel compute that railroad purchases of cars to date this year are larger by 1000 cars than in the corresponding period a year ago.

Local steel sellers have comfortable backlogs and they feel that the next 60 days will find a satisfactory steel market. They count on close buying to spread demand over a longer period than would otherwise be the case.

Pig Iron.—Opinion as to the tendency in the local market is mixed. Some believe that the melt is pointing downward. However, this seems to be disproved by the fact that February shipments are still running ahead of those of January, and furnace stock piles are diminishing. Competition for foundry products is becoming increasingly keen and prices obtained are said to be working to lower levels. In view of wider spreads recently established between pig iron prices at Chicago and at producing centers to the east, there is some speculation as to whether local prices will hold at $20 a ton. It is probable that local sellers will open second quarter books the first week in March. The charcoal iron market is strengthened by the banking of the Newberry furnace. Three charcoal iron furnaces are now in blast. A sale of 1000 tons of Southern iron in western Michigan has been made at $13 a ton, Birmingham.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
S'th'n No. 2 fdy. (all rail)	19.01
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	$28.79 to 29.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Sheets.—Order mails are the largest so far this year, and hot mill operations are at 75 per cent of capacity, with schedules that are better arranged than heretofore. Some producers are looking forward to opening books for the second quarter and, with this move, comes the thought of higher prices. Current quotations at Chicago are 2.80c. to 2.90c. a lb. for black sheets, 3.45c. to 3.55c. for galvanized and 2.35c. for No. 13 gage blue annealed sheets. Some sellers have in mind a $2 a ton advance over these quotations, with the dead line on old orders set for the last day in March. It is interesting that the bulk of current business is flowing from a radius of 100 miles from Chicago. Usually at this time of the year orders from the South and Southwest predominate. Deliveries on most grades of sheets range from 10 days to three weeks.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.80c. to 2.90c.; No. 24 galv., 3.45c. to 3.55c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Cast Iron Pipe.—Demand for this commodity continues to reflect slow but steady improvement. Appleton, Wis., has awarded 10,000 ft. of 6-in. pipe to James B. Clow & Sons. Viroqua, Wis., has placed 4000 ft. of 6-in. pipe with the McWane Cast Iron Pipe Co. The American Cast Iron Pipe Co. has been awarded 17,000 ft. of 6-in. to 16-in. pipe by Wauwatosa, Wis. The Glamorgan Pipe & Foundry Co. is low bidder at Minneapolis on 400 tons of 24-in. pipe, and bids are being opened this week on 1500 tons of 4-in. to 12-in. pipe by Duluth, Minn. Prices are steady at $37 to $38 a ton, Birmingham, for 6-in. and larger diameters.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $45.20 to $46.20; 4-in., $48.20 to $49.20; Class A and gas pipe, $3 extra.

Wire Products.—Mild weather continues in many parts of the country, and this is having a stimulating effect on the wire trade. Orders from jobbers are growing heavier, though it is evident that these tonnages are moving in close conformity with actual needs. Woven wire fencing is in slightly larger demand, but deliveries are still small for this time of the year. Releases by the manufacturing trade are steady, but at a much lower rate than a year ago. Electrical wires in large and medium sizes are in active demand, but orders are scarce for magnet wire and the sizes commonly used by radio manufacturers. Although the expansion in use of wire and wire products is slow, producers are inclined to view the future with confidence on the score that a continuation of mild weather and the drying out of country roads will bring a substantial spring demand.

Rails and Track Supplies.—New rail business is lacking in this market. On the other hand, releases are large and local mills are operating at near capacity. Several orders for track supplies total 3000 tons. Output of these commodities is expanding as the season nears when track laying will get under way. The light rail market is quiet.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.07½c. to 2.15c.; angle bars, 2.75c.

Plates.—Demand for steel by oil and gas companies continues to grow and in so doing lends support to the local plate market. The Barnsdall Corporation is projecting a 6-in. oil line from Okmulgee, Okla., to Milwaukee. Subsidiaries of the Cities Service Co. have placed an order with the A. O. Smith Corporation for 49 miles of 20-in. electrically welded pipe for immediate delivery to Texas. No less impressive is the demand for plates for oil storage tank construction. Two fresh inquiries this week from companies in the Southwest call for a total of 11,000 tons. Previous requests for prices aggregate well above 25,000 tons, so that business of this character now before the trade will take not less than 36,000 tons. It is now known that the Empire Oil & Refining Co. will need about 4000 tons of steel for additions to its refineries at South Chicago, Ill., and at Ponca City, Okla. Shipments of plates for pipe manufacture are in small but steady lots. The large tonnage which has been overhanging this market for many weeks is still in the balance so far as actual specifications are concerned. The

western car market is relatively quiet. The trade expects orders soon for 1000 to 2000 refrigerators from the American Refrigerator Transit Co., and it is highly probable that the Pacific Fruit Express, owned jointly by the Southern Pacific and the Union Pacific, may soon ask for prices on 1500 to 3000 refrigerator cars. Western car shops are holding to uniform programs of production and their specifications to mills are steady. The situation as regards prices for plates is possibly a trifle less clear than a week ago. There is a disposition not to let attractive business go to other producing centers at 1.90c. a lb., Chicago. Universal mills are comfortably fixed as to backlogs. Deliveries for most plate mill products range from three to six weeks.

Structural Material.—Although both awards and inquiries for structural material are smaller than a week ago, the undercurrent of the market points to betterment. Plans for future construction are more numerous, though few of these are developing in the immediate Chicago territory. Small industrial developments are more numerous, and contemplated work by public-utility companies gives much promise. Among the larger projects to which the trade is looking forward is the new Chicago Postoffice, on which plans are well advanced.

Bars.—Users continue to take soft steel bars in close conformity with actual needs. New sales amply support current output and backlogs are not diminishing. Recent reverses in the farm products market have not yet influenced production by manufacturers of farm equipment. There is, however, some room for speculation as to the ultimate outcome. Builders of road machinery are busy, having sizable books and new orders that are normal for this time of the year. Calls for bars by forgers are in close conformity with the demands for forgings by manufacturers of automobiles. The price for mild steel bars is steady at 1.95c. a lb., Chicago. Occasional lots of less desirable character bring 2c. Deliveries are dependent on rolling schedules. As gaged by the demand for alloy steel bars, the automolibe trade gives signs of continued low production. The reason commonly given here is that showrooms and warehouses are now well stocked and output is being gaged almost wholly by actual sales. Although current orders for iron bars are in fair volume, backlogs are almost negligible. Specifications for rail steel bars continue light because the bed trade is experiencing an unseasonable drop in business, and it is still too early for barn equipment manufacturers to use liberal tonnages. Prices remain steady and deliveries are prompt.

Reinforcing Bars.—Outstanding in the market this week are awards for road work in Iowa. This business is being divided among mills at Kansas City, St. Louis and Chicago. A further tonnage is to be placed. The tone of the market is improved. Prices on small tonnages are holding, and fresh inquiries indicate that tests will soon be made on large lots. In the mean time shop operations remain low and backlogs are of meager size. It is reported that upward of 2000 tons of bars will be required for the second unit of the Stateline Generating Co.'s plant at Stateline, Ill. Fair tonnages will be used for central station work at Joliet and Waukegan, Ill. Among new requests for prices are 300 tons for the Milwaukee Road for miscellaneous use. The weather in the closing days of February is very mild for this time of the year and reinforcing bar dealers hope that this will stimulate the market for building materials.

Cold-Rolled Strip.—It is estimated here that for the country as a whole cold-rolled strip mills are operating at 40 to 50 per cent of capacity. The inflow of new business is steady except for automobile manufacturers. A continuance of spring weather is expected to bring more orders from automobile builders.

Bolts, Nuts and Rivets.—Specifications for these commodities are the lowest in several weeks. Releases by farm equipment manufacturers are steady, but the needs of automobile builders are less urgent. Contracts for the second quarter are being prepared at present quotations. These will be offered to the trade beginning with the first week in March.

Coke.—Notwithstanding the belief by some that the foundry melt is lower, the February rate of by-product coke shipments to foundries in this district is measurably above the average of January. Prices are steady at $8 a ton, f.o.b. local ovens.

Old Material.—Several conditions point to the fact that the Chicago scrap iron and steel market is easier. The melt of heavy tonnage grades by steel mills seems to have reached its height for the present. Mild weather is resulting in a larger flow of scrap, and production in many directions is heavier. It is quite evident that many dealers are accepting this view as short sales are reported in many grades. Upward of 20,000 tons of heavy melting steel has been taken by mills in the last week at $14 a gross ton, delivered. Dealers who early in the week had been paying this figure soon dropped to $13.50 a ton. Mills have also purchased about 12,000 tons of cast iron borings at $11 a gross ton, which is an advance of 25c. a ton above the last sale. Short rails are in active demand in this market, in part for local consumption and in part for shipment to western Michigan. This commodity is slow in Milwaukee and prices are lower there than in the local market. Railroad offerings are coming out early in anticipation of a quiet first week in March, when the Institute of Scrap Iron and Steel will hold its annual meeting in Chicago.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel—	
Under 5 tons	2.85c.
5 tons to 30 tons	2.45c.
30 tons and over	2.00c.
Rail steel reinforcement	1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, ⅜ in. and larger	3.55c.
Track bolts	4.55c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.

	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	$2.85 to 2.95
Cement c't'd nails, base per keg	2.85 to 2.95

Prices deliv'd Chicago district consumers:

	Per Gross Ton
Basic Open-Hearth Grades:	
Heavy melting steel	$13.50 to $14.00
Shoveling steel	13.50 to 14.00
Frogs, switches and guards, cut apart, and misc. rails	14.00 to 14.50
Hydraul. compressed sheets	12.50 to 13.00
Drop forge flashings	9.75 to 10.25
No. 1 busheling	11.00 to 11.50
Forg'd cast and r'l'd steel carwheels	18.50 to 19.00
Railroad tires, charg. box size	18.00 to 18.50
Railroad leaf springs cut apart	18.00 to 18.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	16.00 to 16.50
Coil springs	18.25 to 18.75
Electric Furnace Grades:	
Axle turnings	13.00 to 13.50
Low phos. punchings	15.75 to 16.25
Low phos. plates, 12 in. and under	15.75 to 16.25
Blast Furnace Grades:	
Axle turnings	10.75 to 11.25
Cast iron borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Machine shop turnings	7.75 to 8.25
Rolling Mill Grades:	
Iron rails	14.50 to 15.00
Rerolling rails	15.00 to 15.50
Cupola Grades:	
Steel rails less than 3 ft.	17.75 to 18.25
Steel rails less than 2 ft.	18.75 to 19.25
Angle bars, steel	16.00 to 16.50
Cast iron carwheels	15.00 to 15.50
Malleable Grades:	
Railroad	17.50 to 18.00
Agricultural	15.50 to 16.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

	Per Net Ton
Rolling Mill Grades:	
Iron angle and splice bars	15.00 to 15.50
Iron arch bars and transoms	17.50 to 18.00
Iron car axles	25.50 to 26.00
Steel car axles	16.75 to 17.25
No. 1 railroad wrought	12.25 to 12.75
No. 2 railroad wrought	12.00 to 12.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	7.25 to 7.75
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	9.50 to 10.00
Cupola Grades:	
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	13.50 to 14.00
No. 1 agricultural cast	12.00 to 12.50
Stove plate	11.00 to 11.50
Grate bars	11.00 to 11.50
Brake shoes	11.00 to 11.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

New York

Pig Iron Demand Shows No Expansion—Steel Sales at Lower Level Than in January

NEW YORK, Feb. 25.—Pig iron demand in this area shows no noticeable expansion, although inquiry is more active in New England. Sales, at 8000 tons, were in the same volume as in the previous week. The Thatcher Co., Newark, N. J., closed for about 2000 tons for its Garwood plant. Otherwise sales reported were individually rather small. Pig iron shipments are barely holding their own, with some sellers reporting smaller deliveries than in January. Foundry melt shows little improvement and bookings in castings are clearly not large enough to warrant a departure from the cautious policy that has dominated pig iron buying. Price competition is still severe. At least one eastern Pennsylvania furnace is meeting the lowest prices quoted by Southern and Buffalo producers. On Alabama foundry iron $13, base Birmingham, has become a rather common quotation and as low as $12.50 has been done. Delivered prices on eastern Pennsylvania foundry iron have at times figured back to $18, base furnace, and $16, furnace, continues to be the ruling price on Buffalo iron, with occasional shading of that figure. Southern railroads have agreed to extend the present combination rail-and-ship rates on pig iron from April 1 to Sept. 30 unless suspended by the Interstate Commerce Commission. The rate via Savannah, Ga., on iron for delivery by the Ocean Steamship Line to New York is $5.50 a ton. Free lighterage on 200 tons or more to any dock in the Port of New York is included. The rail-and-barge rate via Norfolk, Va., is lower, but advantage cannot be taken of it unless full barge shipments can be arranged for.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$20.91 to $21.41
*Buff. No. 2, del'd east. N. J.	19.28 to 19.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	19.39 to 21.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	19.89 to 21.52

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.

*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Finished Steel.—Steel business in this market has been at about an even level during each of the three weeks of February. Most sales offices report, however, that the volume this month will fall below that of January. The only new feature in the market is the strengthening of prices. This arises not so much from an improved volume of business as from a determination on the part of steel companies to cease making sales at the low figures at which a good deal of tonnage was taken during January and the early part of February. Plate mills both in the East and in the Central district are adhering to a minimum of 1.90c., Coatesville, on plates, or 2.07½c. per lb., New York, and structural mills report that 2.04½c., New York, or 1.90c., Bethlehem, is the present minimum. On small lots, mills are endeavoring to obtain $1 a ton above these prices. Steel bars seem to be steady at 1.85c., Pittsburgh. A more definite stiffening of quotations is apparent on some grades of sheets. Black sheets are held firmly at 2.65c., Pittsburgh, with some companies having named 2.75c. for the second quarter. The present minimum on galvanized sheets seems to be 3.30c., Pittsburgh, although some sales were made a few weeks ago at $1 a ton lower. No change has occurred on blue annealed sheets, the jobbing mill products being quoted at 2.10c. for No. 10 gage and 2.25c. for No. 13 gage. When meeting the competition of continuous mills on the narrower widths, jobbing mills make concessions, but on the widths which they roll exclusively they are holding for the full prices. The structural steel market is fairly active. The New York Central has come into the market for 4000 tons for grade elimination work at 158th Street. New bids are being taken on 6000 tons for Kings County Hospital, Brooklyn. In the railroad equipment field, the only important project pending is 2000 cars for the Seaboard Air Line, which may be ordered soon. New inquiries of importance for cars are lacking, but the Erie Railroad is inquiring for 10 locomotives and 15 tenders.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.19c. to 2.24c.; plates, 2.07½c. to 2.12½c.; structural shapes, 2.04½c. to 2.14½c.

Cast Iron Pipe.—Producers of pressure pipe have booked a fair tonnage of business since the first of the year and are maintaining prices at $36 to $37 a net ton, f.o.b. foundry, recent quotations showing a tendency toward the higher price. Municipalities in this district are beginning to show more activity. Bids were opened today on about 1500 tons of 24-in. and 60 tons of 6-in. water pipe by the Board of Water Commissioners, Brockton, Mass. On March 3, the Board of Water Commissioners, Catskill, N. Y., will open bids on about 3200 tons of 16-in. pipe and 60 tons of 10 and 12-in. pipe and fittings. Stevens & Wood, engineers, New York, buyers for the Allied Power & Light Co. and other utilities, have closed with three different makers on a total of 14,000 tons of gas pipe.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $38.60 to $39.60; 4-in. and 5-in., $41.60 to $42.60; 3-in., $48.60 to $49.60. Class A and gas pipe, $3 extra.

Warehouse Business.—Although February is expected to prove a better month than January, buying is still limited to small lots. A good demand for structural steel from warehouse stocks has not yet developed. However, fabricators are beginning to quote on some small projects, which generally require steel shipped from a warehouse. The black and gal-

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	5.05c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.25c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ⅜ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut threads:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach Screws:	
½ x 6 in. and smaller	60
1 x 6 in. and smaller	50 to 50 and 10

Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.60c. to 3.70c.
No. 22	3.75c. to 3.85c.
No. 24	3.80c. to 3.90c.
No. 26	3.90c. to 4.00c.
No. 28*	4.05c. to 4.15c.
No. 30	4.30c. to 4.40c.

Sheets, Galvanized

	Per Lb.
No. 14	4.00c. to 4.15c.
No. 16	3.85c. to 4.00c.
No. 18	4.00c. to 4.15c.
No. 20	4.10c. to 4.25c.
No. 22	4.20c. to 4.35c.
No. 24†	4.35c. to 4.50c.
No. 26	4.60c. to 4.75c.
No. 28*	4.85c. to 5.00c.
No. 30	5.25c. to 5.40c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

†For 50 bundles or more, 25c. per 100 lb. or less

vanized sheet market is still irregular, with concessions granted whenever a desirable order is offered.

Reinforcing Bars.—Contracts let in the past week included two for subways, amounting to 400 and 450 tons. Prices remain at 1.85c. for mill lengths, and 2.10c. for carload lots cut to length from mill stock, Pittsburgh. Inquiries are few.

Coke.—Prices of furnace grade show a rather wide range for spot shipment, with certain operations in the Connellsville district quoting $2.50 a net ton and others $2.65 and $2.75 a net ton, f.o.b. ovens, all prices being for low sulphur coke. Special brands of beehive foundry coke are $4.85 a net ton, ovens, or $8.56 delivered to northern New Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40, Newark or Jersey City; $10.06, New York or Brooklyn.

Old Material.—Based on prices being offered by brokers with contracts in eastern Pennsylvania, the market on No. 1 heavy melting steel has advanced to $15 a ton, delivered, or $11.50 a ton, f.o.b. New York. Meanwhile, brokers buying for a consumer at Bethlehem, Pa., are withholding shipments of No. 1 heavy melting steel. Heavy breakable cast prices are stronger, with brokers paying a minimum of $14 a ton, delivered eastern Pennsylvania, except in the instance of a Pottsville, Pa., mill, for which shipment $13.50 a ton is still offered. Brokers with orders for steel car axles in eastern Pennsylvania have advanced their prices in the past week to $20 and $21 a ton, delivered, and No. 2 heavy melting steel is being bought at 50c. a ton advance over the previous price, except on shipments to Pottsville, Pa.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel..		$11.50
Heavy melting steel (yard)	$7.75 to	8.50
No. 1 hvy. breakable cast.	9.75 to	10.25
Stove plate (steel works).		8.00
Locomotive grate bars....		8.25
Machine shop turnings....	7.00 to	7.50
Short shoveling turnings..	7.25 to	7.50
Cast borings (blast fur. or steel works).....	7.00 to	7.50
Mixed borings and turnings	6.75 to	7.50
Steel car axles.....	16.25 to	17.25
Iron car axles.....	20.50 to	21.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	9.25 to	9.75
Forge fire	8.50 to	9.00
No. 1 railroad wrought...	11.50 to	12.50
No. 1 yard wrought, long..	10.50 to	11.50
Rails for rolling.....	10.50 to	11.00
Stove plate (foundry)....	8.75 to	9.00
Malleable cast (railroad).	12.50 to	13.00
Cast borings (chemical)..	8.50 to	9.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast.....	$15.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size.....	13.00
No. 2 cast (radiators, cast boilers, etc.)	12.50

Cleveland

Curtailment in Automobile Production Schedules Slows Down Demand for Steel—Effort to Stiffen Prices

CLEVELAND, Feb. 25.—A slowing down in the demand for finished steel, which was to some extent in evidence a week ago, became more pronounced during the past week. There has been quite a decline in specifications from the automotive industry, which accounts for the most part for the lessened volume. Reduction in production schedules has been placed in effect by some of the Michigan automobile companies and this has resulted in stretching out deliveries of steel for which specifications had been issued.

Motor car manufacturers evidently have their dealers pretty well stocked and some plants will operate at a slightly lower rate until the spring buying of automobiles gets under way. It is still too early for motor car manufacturers to determine whether retail sales are to be good this season. A spotty situation exists among the forge and stamping plants engaged in making automobile parts, some being quite well filled with work and others not very busy.

Local steel plants are maintaining their recent operations, with independent open-hearth furnaces running at approximately 90 per cent of capacity. One additional local blast furnace started up during the week after relining. There has been some curtailment in finishing mill operations by some of the manufacturers of sheets and strip steel and some others cannot maintain present schedules long unless orders become more plentiful.

Little or no interest is being shown by consumers in second quarter contracts or prices. It seems probable that the present price of 1.85c., Cleveland, on steel bars and 1.85c., Pittsburgh, on plates and shapes will be established for the coming quarter and that efforts will be made to maintain the market at those prices. A little business has been taken at 1.85c. for delivery extending into the coming quarter. Present prices will be reestablished for the second quarter for most of the lighter rolled products consumed largely by the automotive industry, according to present indications. Some of the mills have announced an advance to 2.75c. on black sheets for the coming quarter, but an advance on other grades, except possibly metal furniture sheets and on hot and cold-rolled strip, seems improbable.

Pig Iron.—The market was less active the past week than during several previous weeks. Cleveland interests sold 14,500 tons of foundry and malleable grades during the week, about evenly divided in prompt shipment and second quarter business. Many foundries are still buying in small lots for early requirements. A moderate volume of inquiry is pending. The Marmon Motor Car Co., Indianapolis, has an inquiry out for 1500 tons for the second quarter, and a southern Ohio melter is inquiring for iron to cover its requirements, which are estimated at around 5000 tons for the quarter. Few foundries specializing on automobile castings have come in the market for their second quarter iron, as they are uncertain how their business will be during the quarter. Shipping orders during February will aggregate about the same as in January. Shipments to the automotive industry are going along at about the recent rate. Agricultural implement foundries and steel casting plants specializing on railroad work are busy and are taking iron in good volume. Ohio foundries operated in January at 82 per cent of normal operations, as compared with 73 per cent in December and with 104 per cent in January last year, according to the monthly report of the Ohio Foundries' Association. Some furnace stocks are growing, and with other producers shipments are keeping up with production. While Southern iron at present prices can be bought at a lower delivered price than Northern iron for shipment to some Ohio points, it is not an important factor because few consumers use much high phosphorus iron. The Corrigan, McKinney Steel Co. blew in a furnace Monday and is now operating its four Cleveland stacks. Cleveland furnaces are holding closely to $18.50, furnace, for foundry and malleable iron, not being disposed to take business for shipment to points where they would have to absorb some of the freight. For local delivery, the market is unchanged at $19, furnace. In Michigan, there is a range of $19.50 to $20, while in northern Indiana $19.50 is the ruling price.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., sil. 1.75 to 2.25	19.51
Malleable	19.50
Ohio silvery, 8 per cent...	28.00
Basic Valley furnace.....	18.50
Stand. low phos., Valley...	$26.50 to 27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6.01 from Birmingham.

Iron Ore.—With an increase of 16 furnaces in blast using Lake ore during January, ore consumption started on the upturn during the month, when 4,101,015 tons was melted, an increase of 24,583 tons over December, according to the monthly report of the Lake Superior Iron Ore Association. The amount consumed in January, last year, was 5,195,034 tons. Ore on hand at furnaces Feb. 1 was 27,674,534

tons, and the amount at furnaces and Lake Erie docks was 33,528,398 tons, as compared with 30,189,105 tons on the same date a year ago. There were 155 furnaces using Lake ore in blast Jan. 31. Lake front furnaces melted 1,949,720 tons of ore in January, an increase of 57,496 tons, and Eastern furnaces used 124,200 tons, a gain of 12,286 tons. Central district furnaces consumed 1,939,214 tons, a loss of 35,100 tons, and all-rail furnaces melted 87,881 tons, a decrease of 10,099 tons.

Semi-Finished Steel.—New demand is lacking, but specifications are holding up well and the leading local producer has enough orders to maintain production at 100 per cent for about a week. Prices are firm at $33, Cleveland and Youngstown, for sheet bars, billets and slabs.

Strip Steel.—Demand for hot-rolled strip is not as active as recently. While mills are maintaining recent operations, they do not have much backlog. Cold-rolled strip is quiet. Prices are unchanged and appear firm at 1.80c., Pittsburgh, for wide hot-rolled strip, 1.90c. for narrow and 2.65c., Cleveland, for cold-rolled strip.

Bars, Plates and Shapes.—Specifications for steel bars, which have been in good demand, fell off somewhat during the week, this being due largely to a decrease in orders from the automotive industry. Demand for plates and shapes, which has been only moderate, also shows a slight decrease. While building work is still quiet, it shows indications of increased activity as there is more work in prospect than for some time. The outlook for reinforcing bars is also more promising. Plate business is confined to small lots. Cleveland has taken bids on revised specifications for a 48-in. water pipe line requiring 3000 tons of plates. Prices are well stabilized at 1.85c., Cleveland, on steel bars and 1.85c., Pittsburgh, on structural shapes. While plates are not as firm as shapes, they are holding to 1.85c. for most business.

Sheets.—Demand has slowed down considerably because of curtailment of specifications and the absence of new business from the automotive industry. Consumers in other fields are not taking up the slack. An advance to 2.75c. on black sheets for the second quarter has been announced by some of the mills and, as leading producers insist that there is no profit in black sheets at a lower price, strong effort is likely to be made to maintain the advance. Mills would like to get automobile body sheets back to 4c., but, with the present condition of the automotive industry, the 3.90c. price probably will be reestablished. The price situation for the coming quarter is less clearly defined on blue annealed, galvanized and continuous mill sheets, but it seems probable that current prices will be continued. One mill has announced a 4c. price on metal furniture sheets for the coming quarter. This was the quotation until recently, when the price was cut to 3.90c.

Wire Products. — Manufacturers' wire is moving fairly well. While the 2.40c. price appears well maintained, some consumers evidently are still securing shipments against contracts taken at concessions. Demand for merchant wire products is spotty, being good in some sections and poor in others.

Coke.—Demand for foundry coke is rather light. The present price of $8.25, ovens, has been reaffirmed for Ohio by-product coke for March shipment. Connellsville foundry coke price is unchanged. Warm weather has cut down the demand for domestic heating coke and, while producers have considerable business on their books, dealers are withholding shipping orders.

Bolts, Nuts and Rivets. — The demand for bolts and nuts is fair, but rather spotty. The automotive industry is not buying very freely. Business from railroads is good. The industry is operating at about 65 per cent of capacity. The leading local rivet maker announces that it will reestablish its present price of $3.10 per 100 lb., Cleveland and Pittsburgh, for the second quarter.

Old Material. — There was a fair volume of activity in steel-making and blast furnace grades during the week, but it was confined almost wholly to transactions between dealers, who are covering on old contracts. Local mills, as a result of recent purchases, have considerable scrap under contract and are not in the market at present. They continue to take material in fair volume, although two are regulating shipments. The market is steady at recent prices. Dealers have no difficulty in purchasing all the scrap they need at quoted prices.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel..	$14.00 to	$14.50
No. 2 heavy melting steel..	13.25 to	13.75
Compressed sheet steel....	13.00 to	13.50
Light bundled sheet stampings	11.50 to	12.00
Drop forge flashings.....	12.00 to	12.50
Machine shop turnings....	10.50 to	11.00
Short shoveling turnings..	11.50 to	12.00
No. 1 railroad wrought...	13.00 to	13.50
No. 2 railroad wrought...	14.00 to	14.50
No. 1 busheling.....	12.00 to	12.50
Pipes and flues.....	9.00 to	9.50
Steel axle turnings.....	12.50 to	13.00
Acid Open-Hearth Grades:		
Low phos., forging crops..	17.75 to	18.00
Low phos., billet bloom and slab crops.....	18.50 to	18.75
Low phos., sheet bar crops	18.00 to	18.50
Low phos., plate scrap....	18.00 to	18.50
Blast Furnace Grades:		
Cast iron borings.....	10.50 to	11.00
Mixed borings and short turnings	10.50 to	11.00
No. 2 busheling.....	10.00 to	10.50
Cupola Grades:		
No. 1 cast.....	15.25 to	15.75
Railroad grate bars.....	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft.....	18.50 to	19.50
Miscellaneous:		
Railroad malleable	18.00 to	18.50
Rails for rolling.....	16.25 to	16.50

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes.....	3.00c.
Soft steel bars.....	3.00c.
Reinforc. steel bars.....2.25c. to	2.50c.
Cold-fin. rounds and hex.....	3.65c.
Cold-fin. flats and sq.....	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip .....*	5.95c.
Black sheets (No. 24).....	3.75c.
Galvanized sheets (No. 24).....	4.50c.
Blue ann'l'd sheets (No. 10).....	3.25c.
No. 9 ann'l'd wire, per 100 lb.....	$2.75
No. 9 galv. wire, per 100 lb.....	3.20
Com. wire nails, base per keg.....	2.65

*Net base, including boxing and cutting to length.

Philadelphia

Less Shading of Steel Prices But Orders Are Small—Scrap Advances 50c. a Ton

PHILADELPHIA, Feb. 25.—Most steel mills are maintaining fair rates of operation, although the business on their books is small and they are generally dependent upon the tonnage booked from week to week. While February business has not equaled that of January, inquiry for most products has improved in the past few days. Prices show some firmness, despite the lack of new business, and concessions are becoming less common. Except for the Chesapeake & Ohio, the railroads are inactive. This road has asked for prices on about 4000 tons of plates, shapes and bars and an unspecified tonnage of bolts, nuts and spikes for second quarter delivery.

Ferromanganese.—With quotations for ferromanganese based on the recently adopted quantity differential, ranging from $94 to $99 a ton, seaboard, the minimum price being for 2000 tons or more, certain small users which are subsidiaries of larger interests have been pooling their requirements to obtain the price granted for a large quantity. Sellers, however, are opposing the efforts of small unrelated consumers to pool their requirements similarly. The Panama Canal Commission will open bids March 13 on two tons of ferromanganese and 10 tons of 10 per cent ferrosilicon.

Pig Iron.—Foundry iron is moderately active and prices are fairly well maintained, except when competition is encountered from Southern pig iron. In the past fortnight, eastern Pennsylvania sellers have found Birmingham furnaces less active in seeking business in this district. The Baldwin Locomotive Works, Eddystone, Pa., is inquiring for 1500 to 2000 tons of floor iron. Recent requirements of the company for this grade and for cylin-

der iron have been placed with a Southern maker. The General Steel Castings Co., Eddystone, Pa., has closed on 1000 tons of low phosphorus iron with an eastern Pennsylvania merchant furnace. The Pusey & Jones Co., Wilmington, Del., is in the market for 400 tons of foundry iron, part high manganese. Users of basic are showing interest in buying and have obtained quotations from Birmingham as well as eastern Pennsylvania furnaces. Although there have been no recent sales of basic, sellers concede the market to be $19.25 to $19.50, delivered.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$20.76 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.26 to 21.76
East. Pa. No. 1X	21.76 to 22.26
Basic (del'd east. Pa.)	19.25 to 19.50
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. east. Pa. furnace)	24.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.00 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Bars.—The price is maintained at 1.85c. a lb., Pittsburgh, or 2.17c., delivered Philadelphia, but current buying is limited to lots of less than a carload.

Reinforcing Bars.—A substantial tonnage of business is pending award, but buyers are slow to act. Reinforcing bars in Philadelphia sewer contracts on Hoyt Avenue, 1000 tons, and a State road, 200 tons, have been awarded to the Truscon Steel Co. Competition between rail and billet steel bars is still keen and billet steel bars range from 1.90c. to 1.95c. a lb., Pittsburgh, or 2.22c. to 2.27c., delivered Philadelphia, with the usual extra for cutting to length omitted. Rail steel bars are 1.75c. to 1.80c., Franklin, Pa., and Tonawanda, N. Y., or 2.07c. to 2.12c., delivered Philadelphia.

Shapes.—Few fabricated steel projects are pending award in this district and local fabricating shops are in need of business. Shape mills are maintaining fair operating rates and prices show no further downward trend despite the lack of new tonnage coming to the mills. Quotations range from 1.80c. to 1.85c., f.o.b. nearest mill to consumer, or 1.86c. to 1.91c., delivered Philadelphia.

Plates.—Prices are holding at 1.90c. to 1.95c., Coatesville, with only small tonnages being bought. Shipbuilders and other large, preferred buyers would be granted some concession. Plate mills are awaiting with interest the opening of bids today and Feb. 28, in Washington, on the first two of three groups, comprising 30 vessels, for ocean mail routes.

Sheets.—Local consumers of sheets are operating irregularly and consuming only a small portion of their usual requirements. Automobile body manufacturers are buying only small lots of sheets and radio manufacturers are producing at a small percentage of capacity. Sheet prices show some firmness, which is untested by inquiries for sizable tonnages. Black sheets are quoted at 2.65c., Pittsburgh, or 2.97c., delivered Philadelphia, and galvanized at 3.30c., Pittsburgh, or 3.62c., delivered Philadelphia. Blue annealed sheets are 2.20c., Pittsburgh, or 2.52c., Philadelphia, for No. 13 gage and blue annealed plates are 2.10c., Pittsburgh, or 2.42c., Philadelphia, for No. 10 gage. When competition with the product of the continuous mill is encountered, some concessions from these quotations are often granted on blue annealed sheets.

Imports.—In the week ended Feb. 21, 2580 tons of chrome ore arrived at this port from Portuguese Africa. Steel imports consisted of 70 tons of bearing steel, 13 tons of billets and 11 tons of rods from Sweden and 15 tons of hoop steel from the United Kingdom.

Old Material.—No. 1 heavy melting steel has advanced 50c. a ton to $15 a ton, delivered eastern Pennsylvania, based on a small purchase by a consumer in this district and offers of brokers to buy at an equivalent price. Meanwhile, a consumer at Bethlehem, Pa., has requested brokers to temporarily postpone shipments on contracts. Other grades of scrap are firm but unchanged.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$15.00
Scrap T rails	14.50
No. 2 heavy melting steel	$11.50 to 13.00
No. 1 railroad wrought	15.00 to 15.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	13.00 to 13.50
Hydraulic compressed, old	12.00 to 12.50
Machine shop turnings (for steel works)	11.00
Heavy axle turnings (or equiv.)	12.50 to 13.00
Cast borings (for steel works and roll. mill)	11.00
Heavy breakable cast (for steel works)	13.50 to 14.00
Railroad grate bars	11.00 to 11.50
Stove plate (for steel works)	11.50 to 12.50
No. 1 low phos., hvy., 0.04% and under	20.50 tc 21.50
Couplers and knuckles	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
No. 1 blast f'nace scrap	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	14.00
Shafting	19.00
Steel axles	20.00 to 21.00
No. 1 forge fire	13.00 to 13.50
Cast iron carwheels	15.00
No. 1 cast	15.00 to 15.50
Cast borings (for chem. plant)	14.00 to 14.50
Steel rails for rolling	15.00 to 15.50

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ¼-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel planished	4.30c.
Reinforc. steel bars, sq., twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.55c.
Steel bands, No. 12 to ¼-in. inclus.	3.30c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.80c.
†Galvanized sheets (No. 24)	4.45c.
Light plates, blue annealed (No. 10)	3.25c.
Blue ann'l'd sheets (No. 13)	3.40c.
Diam. pat. floor plates—	
¼-in.	5.30c.
¼-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Financial Reports

National Tool Co., Cleveland, earned $95,233 last year before Federal taxes, as compared with $67,083 during the previous year.

Electric Controller & Mfg. Co. reports net profits of $926,483 during 1929 after taxes and other charges. This was equal to $13.07 a share, as compared with $6.31 a share in 1928.

Perkins Machine & Gear Co., West Springfield, Mass., during the past two years increased its gross business more than 100 per cent. After allowing for preferred stock dividends, the company earned about $5 a share on its common stock capitalization in 1929. Julius S. Perkins has been re-elected president and John J. Duggan treasurer.

Earnings of the Midland Steel Products Co. for 1929 were $2,555,425 after all charges, including estimated Federal taxes, before dividends. This compares with $2,429,773 after the same charges in 1928. The increase in net over the preceding year was in spite of a sharp decline in business in the last quarter.

National Acme Co., Cleveland, reports net earnings of $2,101,355 during 1929, or $4.20 a share on 500,000 shares of common stock, as compared with $1,209,114, or $2.40 a share in 1928.

Consumption Is Financed Through Wages

"Wages are no longer wages. They are credits extended to the working man. They do not represent what labor demands, but what business, for business purposes, must invest if consumption is to be adequately financed," said Charles F. Abbott, executive director, American Institute of Steel Construction, New York, in an address before the Institute of Trade Association Executives and the Denver Advertising Club at Denver, Feb. 25.

Selling is undergoing radical changes, he declared, because successful business programs today are predicated upon the needs and desires of consumers.

"Recognizing wages as consumer credit, savings as capital investment, we are compelled to acknowledge that there is a companionate relationship between employer and employee, a unity of purpose between buyer and seller."

Pacific Coast

Steel Awards Not Heavy, but Business in Prospect Is in Increasing Volume—Plate Prices Weak

SAN FRANCISCO, Feb. 22 (*By Air Mail*).—Although awards this week were not particularly heavy, a fair amount of business was booked in small tonnages and the trade is encouraged over the volume of new projects coming up for figures or in prospect. The two outstanding projects of the week involved 1000 tons of plates and 1000 tons of shapes for 200 freight cars for the Chicago, Milwaukee, St. Paul & Pacific Railroad, to be built at the Renton, Wash., shop of the Pacific Car & Foundry Co. This business was divided between the United States Steel Products Co. and the Pacific Coast Steel Corporation.

Pig Iron.—Movement of foundry pig iron continues to be limited to small lots for prompt shipment. Prices remain unchanged.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—The Pacific Coast Steel Corporation was awarded 250 tons for an apartment house on Spring Street, Seattle. Bids were opened on 108 tons for a bridge in Siskiyou County, Cal., and bids will be opened on March 12 on 192 tons and 120 tons respectively for highway work and a bridge in San Joaquin County, Cal. Out-of-stock prices in the bay district continue unchanged at 2.30c., base, on carload quantities and at 2.60c. on smaller lots. Los Angeles prices are $2 a ton higher. Merchant bar steel continues to move in small lots only, and the price on this class of material continues at 2.35c., c.i.f.

Plates.—With the exception of the plate tonnage for 200 freight cars, mentioned above, bookings were confined to lots of less than 100 tons. No action has yet been taken by the Standard Oil Co., San Francisco, on its inquiry for 640 tons. Prices are weak, and 2.25c., c.i.f., appears to represent the top of the market, large lots bringing prices $2 to $3 a ton lower.

Shapes.—Bookings this week consisted mostly of jobs under 100 tons. The Judson-Pacific Co. took 250 tons, including 40 tons of Junior beams, for an office building at Salinas, Cal., and the McClintic-Marshall Co. secured 140 tons for two factories on Pitt Street, Los Angeles. Bids will be opened Feb. 25 on 970 tons for a municipal auditorium at Long Beach, Cal. The largest pending project calls for 1400 tons for a hospital at the Presidio, San Francisco, bids on which will be opened Feb. 25. Plain structural shapes are firm at 2.35c., c.i.f.

Cast Iron Pipe.—Awards of cast iron pipe included 200 tons of 6 to 10-in. Universal cast iron pipe for Colfax, Wash., placed with the Central Foundry Co., and 187 tons of 12-in. Class B pipe for Port Townsend, Wash., secured by Thomas Jones & C. R. Crodon. The United States Pipe & Foundry Co. booked 190 tons of 10-in. Class 250 pipe and 16-in. Class 200 pipe for Alhambra, Cal. Bids were opened Feb. 18 on 205 tons of 4 and 6-in. Class B pipe for the improvement of Compton Avenue, Compton, Cal. The Pacific States Cast Iron Pipe Co. was low bidder on 123 tons of 4 to 8-in. Classes B to E pipe for Tacoma, Wash. Glendale opened bids this week on 1545 tons of 6 to 30-in. Classes B, C and 250 pipe. Bids will be opened on March 10 for 147 tons of 10-in. Class 150 pipe for the United States Army to be delivered at Manila, P. I. Bids were opened on 114 tons of 6 and 8-in. Class C pipe for Bremerton, Wash., and also on 108 tons of 2 to 6-in. Class 150 pipe for Tempe, Ariz. Aberdeen, Wash., opened bids this week on 263 tons of 2 to 12-in. Class B pipe.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.30c.
Soft steel bars	3.30c.
Small angles, ⅞-in. and over	3.15c.
Small angles, under ⅞-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.90c.
Galv. sheets (No. 24)	5.30c.
Struc. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Pig Iron Inquiry Improves—Steel Demand Good, with Operations at 94 Per Cent of Capacity

BIRMINGHAM, Feb. 25.—Inquiries for pig iron were better last week. Though the bulk of them are for fill-in tonnages, interest in second quarter is steadily increasing. Prospects of an improved demand from soil pipe makers within 30 days add to the tone of the market. Buying last week showed a slight gain over that of the previous week. All sales for delivery in the district were at $15, base. Current shipments are reported to be equal to output. Seventeen furnaces are active, the same as last week. Of this number 11 are on foundry, five on basic and one on recarburizing iron.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$15.00
No. 1 fdy., 2.25 to 2.75 sil.	15.50
Basic	15.00

Finished Steel.—The steady gait of new business during the past 10 days has averaged close to that of the corresponding period last year, almost every line sharing well in the orders. The aggregate of new business is ample to sustain the present rate of production, which is about 94 per cent of ingot capacity. Inquiries are well sustained. Prices show more steadiness than in several weeks. Recent business taken by fabricating shops is stimulating specifications for structural shapes. The Virginia Bridge & Iron Co. has booked an order for 1000 tons for the new sheet mill of the Gulf States Steel Co., and the Ingalls Iron Works Co. will furnish 700 tons for the same project. Other good-sized projects are pending. Demand for reinforcing bars is improving from jobbing trade. Active open-hearths total 20, the same as last week.

Cast Iron Pipe.—Pressure pipe makers have booked additional orders for utilities, two or three of which call for large tonnages to be delivered over several months. Municipal buying in this territory is slower than in several years, though district plants have booked a fair amount of orders for cities in distant territories and are still experiencing a demand from the same fields. District plants submitted bids on the 1200-ton project at Cleveland. The project at Kansas City, Mo., to require around 8000 tons of 34 to 36-in. pipe, is being bid on by plants here. Shipments are equal to the current make. Prices are steady at $37 to $38 a ton, base Birmingham.

Old Material.—The market for scrap is dull. Shipments to one or two of the large steel mills comprise the only movement of scrap of consequence. Prices are nominal and unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$13.00 to $13.50
Scrap steel rails	14.00
Short shoveling turnings	9.00
Cast iron borings	9.00
Stove plate	11.50 to 12.00
Steel axles	22.00
Iron axles	23.00
No. 1 railroad wrought	10.00 to 10.50
Rails for rolling	15.50
No. 1 cast	13.00
Tramcar wheels	12.50
Cast iron carwheels	13.00 to 13.50
Cast iron borings, chem.	13.50 to 14.00

Boston

Pig Iron Buying in Larger Volume Expected—Several Inquiries for Good-Sized Tonnages Pending

BOSTON, Feb. 25.—The past week was quiet in the pig iron market. Increased activity is anticipated, however, as a Massachusetts foundry probably will close on 2000 tons of No. 2X and No. 1X, another Masachusetts concern on 1000 tons, the Universal Winding Co., Providence, R. I., on 500 tons of No. 2X and an equal amount of No. 1X, May, June and July delivery, and the Rhode Island Malleable Iron Co. on 500 tons of malleable. There are also several lots of 100 to 300 tons under negotiation. A Massachusetts heater manufacturer is sounding out the market on 5000 to 6000 tons of No. 2 iron, but has issued no formal inquiry.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$21.41 to	$21.91
*Buffalo, sil. 2.25 to 2.75	21.41 to	21.91
East. Penn., sil. 1.75 to 2.25	22.65 to	23.15
East. Penn., sil. 2.25 to 2.75	23.15 to	23.65
Va., sil. 1.75 to 2.25		25.21
Va., sil. 2.25 to 2.75		25.71
*Ala., sil. 1.75 to 2.25		24.11
*Ala., sil. 2.25 to 2.75		24.61
†Ala., sil. 1.75 to 2.25		20.25
†Ala., sil. 2.25 to 2.75		20.75

Freight rates: $4.91 all rail from Buffalo; $3.65 all rail from eastern Pennsylvania; $5.21 all rail from Virginia; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

Reinforcing Steel.—A New York company was awarded 400 tons of billet reinforcing bars for a Newington, Conn., hospital, and the Concrete Steel Co. will furnish 165 tons for a Boston garage. Several hundred tons required for a Boston bank addition has not yet been awarded. Bids close March 11 on 400 tons required for a local telephone exchange; 200 tons will be needed for a Lexington, Mass., hospital addition and 200 tons for a Lynn, Mass., school. Prices quoted openly on billet bars are: From stock, 1 to 5 tons, 3.16½c. to 3.26½c. a lb., f.o.b. metropolitan Boston; 5 to 99 tons, 2.86½c.; 100 tons and more, 2.76½c. The open price for rail steel bars is 2.26½c. a lb., base, delivered Boston freight rate points, but that can be bettered on attractive tonnages.

Cast Iron Pipe.—Higher prices asked recently for domestic cast iron pipe do not appear to be holding. A fortnight ago, 4-in. stock was openly quoted at $48.10 to $49.10 a ton, delivered common Boston freight rate points, and 6-in. and larger at $43.10 to $45.10. Now most business is being done on the bases of $46.10 a ton for 4-in. and $42.10 for 6-in. and larger pipe. Most foundries are holding to a $4 a ton differential on Class A and gas pipe. Taunton, Mass., has placed 200 tons of 6-in. pipe with the United States Pipe & Foundry Co., and Meriden, Conn., has ordered its 1930 requirements, a round tonnage, from the Warren Foundry & Pipe Co. Several hundred tons also was placed the past week privately. Brockton, Mass., closes bids today on 900 tons of 24-in. pipe, and Lawrence, Mass., on Feb. 28 for 200 tons of 4 to 8-in. Middletown, Conn., has tentative plans to buy about 16,000 ft. of pipe.

Old Material.—The feature of the scrap market the past week was the purchase of a few hundred tons of selected No. 1 heavy melting steel at $11.05 to $11.30 a ton, on cars shipping point, and a subsequent drop in the market to $10.50 to $11, with $10.80 the prevailing price. At $11.05 to $11.30 a ton on cars here, the delivered prices in the Pittsburgh territory were $16.75 to $17. A tonnage of Boston & Maine Railroad heavy melting steel was sold at the equivalent of $17.50 a ton, delivered Pittsburgh. A Worcester, Mass., mill is still buying long bundled skeleton at $11 a ton, delivered, which figures back to around $9.10 a ton, on cars here, a little higher than the price of a week ago. Steel mill borings are about 25c. a ton higher. Dealers are paying $14.50 a ton, on cars shipping point, for shafting to apply on $18.50 Pittsburgh orders. For steel axles, $17 a ton, shipping point, is the prevailing price, although small lots have been sold at $16.50.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$10.50 to	$11.00
Scrap T rails	10.25 to	10.50
Scrap girder rails	9.25 to	9.50
No. 1 railroad wrought	10.50 to	11.00
No. 1 yard wrought	9.50 to	10.00
Machine shop turnings	6.50 to	7.00
Cast iron borings (steel works and rolling mill)	6.25 to	6.75
Bundled skeleton, long	9.00 to	9.50
Forge flashings	9.00 to	9.25
Blast furnace borings and turnings	5.50 to	6.00
Forge scrap	8.50 to	9.00
Shafting	14.50 to	15.00
Steel car axles	16.50 to	17.00
Wrought pipe 1 in. in diameter (over 2 ft. long)	9.00 to	9.50
Rails for rolling	11.50 to	12.00
Cast iron borings, chemical	8.50 to	9.00

Prices per gross ton deliv'd consumers' yards:

Textile cast	$13.00 to	$14.00
No. 1 machinery cast	15.00 to	15.25
No. 2 machinery cast	14.00 to	14.50
Stove plate	10.50 to	11.00
Railroad malleable	17.00 to	17.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.

	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Youngstown

February Steel Shipments Heavier Than Those of Last Month, Due Chiefly to Automobile Orders

YOUNGSTOWN, Feb. 24.—Because of the heavier requirements of two or three large automobile manufacturers, shipments of finished steel products out of the Valleys in February will probably be somewhat larger than they were in the preceding month. However, most of this improvement is accounted for by strip steel, bars and certain finishes of sheets, and the increase has not been evenly distributed among Valley mills. Steel ingot operations have been comparatively constant for the last two or three weeks, the average for the district standing at close to 75 per cent. Although this rate is slightly ahead of the aggregate activity of finishing mills, a partial explanation is offered by the fact that the finishing capacity of one or two large companies is considerably higher than its ingot-making capacity.

Strip mill operations, which have gained most in the last three weeks, have been helped not a little by the increasing requirements of pipe mills making the smaller sizes of welded tubing. Demand for this product has become rather active, but the larger sizes of pipe for oil country and other uses are still very dull. Standard tubing is also in light demand, but mills are beginning to step up production in preparation for spring demand. The strip steel requirements of the automobile industry are still growing, but cold-rolled material is not moving nearly so well as hot-rolled. In some plants a few mills now have as much as two weeks' good operating schedules before them, but the aggregate operating rate is not above 70 per cent of capacity. The Valley sheet industry is running at 65 to 70 per cent of capacity. Demand for sheets is spotty and extremely light in some finishes.

Galvanized material is sluggish, but is expected to improve with the coming of warmer weather. Tin mill operations are improving gradually and production of bars, for which Valley mills have a large capacity, has shown only the slight improvement provided by the automobile industry.

Prices are still giving concern to producers, but are no weaker. Recently established minimum quotations on sheets are being adhered to by the larger producers, and one large maker has announced that its second quarter price on black sheets will be 2.75c., Pittsburgh, an advance of $2 a ton over the present market quotation and of $3 and $4 over figures which had recently been rather frequent in the Detroit territory. No decisions regarding second quarter quotations on the other finishes have been reached, the current prices being 3.30c. for galvanized, 2.10c. for light plates and 2.25c. for blue annealed sheets. Automobile body sheets are unchanged at 3.90c. and metal furniture at 3.90c. to 4c. A reduction in the width extras on the wider sizes of full-finished sheets is being considered. Strip steel prices have a semblance of firmness and bars are fairly well established at 1.85c., Pittsburgh. Semi-finished steel quotations are having little test and are standing at $33, Pittsburgh or Youngstown, for billets, slabs and sheet bars.

The pig iron market is slightly more active from the standpoint of shipments and the four merchant furnaces now operating will ship more iron than they will make in February. Prices are being tested only on small lots and remain at $18.50 for foundry and basic iron and $19 for malleable and Bessemer. The scrap market seems to be slightly weaker, following a period of heavy buying.

St. Louis

Pig Iron Buying Subsides—Fair Demand for Plates, Shapes and Bars—Scrap More Active

ST. LOUIS, Feb. 25.—The buying movement in pig iron, which was stimulated by the activities of Southern makers, who made low prices, has subsided, and the past week has been rather quiet. It is believed by some factors that most of the requirements of melters in the district for first quarter have been taken care of, and in some instances purchases are of sufficient volume to extend well into the second quarter, unless orders for finished products should greatly exceed present expectations. The action of one maker in putting on another furnace, for which business is desired, and the failure of another maker to get a satisfactory volume at the low prices of $13 to $13.50, f.o.b. Birmingham, have caused a slight weakness in the market. The St. Louis Gas & Coke Corporation sold approximately 2000 tons during the week in scattered lots. Consumption by the steel mills in the district is said to be heavy. Business with the jobbing foundries is disappointing, but foundries catering to the automobile trade report an improvement.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$19.50 to $20.00
Malleable, f.o.b. Granite City	20.00
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	17.42 to 18.42
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Finished Steel.—Business is quiet in most lines. Specifications against contracts and new orders for plates, shapes and bars are said to be coming in in fair volume, but sheet business is rather light. Reinforcing bar interests expect a marked improvement within the next few weeks. The Missouri Highway Commission will let contracts Feb. 28, involving about 500 tons of reinforcing bars. The Mississippi Valley Structural Steel Co., which a week or so ago received the order for 2200 tons of structural steel for a dam at Bagnell, Mo., has also been awarded 1000 tons for a toll building in St. Louis for the Southwestern Bell Telephone Co.

Old Material.—The scrap market took on new life, with the sale by dealers during the week of from 15,000 to 20,000 tons of steel grades to several consumers in the district. Receipts in this market are light, most of them coming from railroads, the country dealers holding off because they say prices are too low. Prices are unchanged. Railroad lists: Missouri-Kansas-Texas, 700 tons; St. Louis-Southwestern, 17 carloads; Nashville, Chattanooga & St. Louis and Chicago & Eastern Illinois, seven carloads each.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$12.50 to $13.00
No. 2 heavy melting or shoveling steel	11.75 to 12.25
No. 1 locomotive tires	14.50 to 15.00
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	13.50 to 14.00
Railroad springs	16.00 to 16.50
Bundled sheets	9.50 to 10.00
No. 2 railroad wrought	12.50 to 13.00
No. 1 busheling	9.75 to 10.25
Cast iron borings and shoveling turnings	9.25 to 9.75
Iron rails	13.00 to 13.50
Rails for rolling	14.00 to 14.50
Machine shop turnings	6.75 to 7.25
Heavy turnings	9.00 to 9.50
Steel car axles	19.50 to 20.00
Iron car axles	26.00 to 26.50
Wrot. iron bars and trans.	21.50 to 22.00
No. 1 railroad wrought	13.00 to 13.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	14.00 to 14.50
Cast iron carwheels	14.00 to 14.50
No. 1 machinery cast	15.25 to 15.75
Railroad malleable	14.50 to 15.00
No. 1 railroad cast	14.00 to 14.50
Stove plate	11.75 to 12.25
Relay. rails 60 lb. and under	20.50 to 23.50
Relay. rails 70 lb. and over	26.50 to 29.00
Agricult. malleable	13.00 to 13.50

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.15c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Canada

Structural Steel and Pig Iron Demands Gain

TORONTO, ONT., Feb. 25.—The demand for merchant pig iron in the Canadian markets is beginning to show some improvement. While sales for the first half of this quarter were slightly under those for the corresponding period of last year, a turn for the better is now in evidence. Following the recent price reduction, melters are buying more extensively for immediate needs and are also taking in supplies for a month or six weeks ahead. The melt is well sustained.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	22.50
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—The past week brought gains in the demand for structural steel. In addition to a steady flow of small tonnage orders, two fairly substantial contracts were closed. The structural steel required for various new structures proposed by the Canadian National and Canadian Pacific Railroads throughout Canada for

this year will involve upward of 25,000 tons of steel, and other large tonnages will be needed for bridges.

Cast Iron Pipe.—Bids are being received by J. E. Gauthier, clerk, City Hall, Montreal, Que., until March 3 for cast iron pipe as follows: 2400 ft. of 4-in., 30,000 ft. of 6-in., 72,000 ft. of 8-in., 6000 ft. of 10-in., 6000 ft. of 12-in.

Old Material—In keeping with the betterment developing in other lines, business on a larger scale is now reported for iron and steel scrap both in the Toronto and Montreal markets. Mills are coming into the market for supplies, and sales of heavy melting steel and turnings are in larger tonnage. The principal demand is for the iron grades, with machinery cast well in the lead.

Dealers' buying prices:

Per Gross Ton

	Toronto	Montreal
Heavy melting steel.	$9.00	$8.00
Rails, scrap.....	11.00	9.00
No. 1 wrought.....	9.00	11.00
Machine shop turnings	7.00	6.00
Boiler plate.....	7.00	6.50
Heavy axle turnings	7.50	6.50
Cast borings	6.50	5.00
Steel borings	6.50	6.00
Wrought pipe	6.00	6.00
Steel axles	14.00	17.00
Axles, wrought iron..	16.00	19.00
No. 1 machinery cast	....	16.00
Stove plate	....	12.00
Standard carwheels..	....	14.50
Malleable	....	13.00

Per Net Ton

No. 1 mach'ry cast..	$15.00	....
Stove plate	11.00	....
Standard carwheels..	14.00	....
Malleable scrap.....	11.00	....

Gulf States Steel Awards Contracts for Extensions

The Gulf States Steel Co. has awarded contracts for 1700 tons of structural steel for its new sheet mill being built in connection with its Alabama City works development program. The new plant will be equipped with six sheet mills, one of which will use the American Rolling Mill Co. continuous rolling process. F. H. McGraw & Co., New York, are handling engineering details of the project.

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinforc. bars.....	3.15c.
Rail steel reinforc. bars.....	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.....	3.85c.
Squares	4.35c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.45c.
Structural rivets	4.20c.
Small rivets .....60 per cent off list	
No. 9 ann'l'd wire, per 100 lb.....	$3.00
Com. wire nails, base per keg.....	2.85
Cement c't'd nails, base 100 lb. keg	2.85
Chain, per 100 lb.....	10.25
	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in..	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in....	17.50
4-in.	36.00

Cincinnati

Southern Pig Sold in District at a $13 Birmingham Base—Demand for Sheets Falls Off Sharply

CINCINNATI, Feb. 25. — While district consumers of pig iron are not closing for large tonnages, their repeated purchases of small quantities are keeping the weekly averages of district sellers high. This has been especially true during February, when each week eclipsed the preceding one. Last week's sales totaled 8500 tons, or about 200 tons over those of the preceding week. Among the sales was about 2800 tons of Southern iron, which was sold at prices ranging from $13 to $14, base Birmingham. Southern prices in this district receded another 50c., bringing the Birmingham base quotation for shipment into this area to $13. This, however, appears to be the bottom price now in this area, furnaces having refused a large tonnage last week at a concession of about 25c. from this quotation. Northern furnaces have maintained prices except for small concessions on silicon differentials. A Southern Ohio consumer took 2000 tons of Northern foundry iron, a Tennessee buyer closed for 600 tons and a northern Ohio user bought 1500 tons. The Marmon Motor Co., Indianapolis, is in the market for 1000 to 1500 tons of malleable iron, and an undisclosed southern Ohio melter is inquiring for 7500 tons.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$19.89 to $20.39
Ala. fdy., sil. 1.75 to 2.25	16.69 to 17.69
Ala. fdy., sil. 2.25 to 2.75	17.19 to 18.19
Tenn. fdy., sil. 1.75 to 2.25	17.19 to 17.69
S'th'n Ohio silvery, 8 per cent	26.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Finished Material.—Sales of district sheet mills lagged noticeably behind production last week, making further reduction of operating schedules imperative. New business averaged 50 per cent of normal production, while mills were operating at about 77 per cent of capacity. The leading producer of sheets in this district has announced the following quotations for second quarter: 2.75c., base Pittsburgh, on No. 24 gage black sheets; 3.90c., base Pittsburgh, on automobile body sheets; 4c., base Pittsburgh, on furniture sheets; 2.10c., base Pittsburgh, on No. 10 gage light plate; 1.80c., base Pittsburgh, on hot-rolled strip, and 2.75c., base Cleveland, on cold-rolled strip.

Coke.—Shipments of by-product and beehive foundry coke in February were well ahead of those of January. Prices of by-product foundry grades will continue in March at about $10.05, delivered Cincinnati.

Old Material.—A slackening of mill operations and a resultant lagging of demand for scrap material has given the scrap market an undertone of uncertainty. Dealers are bidding 25c. less for heavy melting steel and No. 2 wrought than a week ago. New business is very quiet and shipments on contract have lessened during the last week.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$12.50 to $13.00
Scrap rails for melting	13.25 to 13.75
Loose sheet clippings	8.00 to 8.50
Bundled sheets	10.75 to 11.25
Cast iron borings	9.00 to 9.50
Machine shop turnings	8.25 to 8.75
No. 1 busheling	10.00 to 10.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	13.50 to 14.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	12.75 to 13.25
Short rails	17.75 to 18.25
Cast iron carwheels	12.00 to 12.50
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	15.00 to 15.50
Burnt cast	10.00 to 10.50
Stove plate	10.00 to 10.50
Brake shoes	10.00 to 10.50
Agricultural malleable	14.00 to 14.50
Railroad malleable	15.00 to 15.50

Buffalo

Pig Iron Sales About 10,000 Tons—Steel Operating Schedules Show Slight Gain—Scrap Tone Strong

BUFFALO, Feb. 25.—The aggregate booking of pig iron the past week was about 10,000 tons, mostly in small lots. An order of 500 tons of foundry for New England is included. More inquiry is coming out of the East, including one for 1000 tons of foundry and one for 2000 tons of malleable. Repairs on a Donner blast furnace, which has been out since December, will be completed early this week, but this stack may not be blown in immediately.

Prices per gross ton f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$18.50
No. 2X fdy., sil. 2.25 to 2.75	19.00
No. 1 fdy., sil. 2.75 to 3.25	20.00
Malleable, sil. up to 2.25	19.00
Basic	17.09
Lake Superior charcoal	27.28

Finished Steel. — The operating schedules of the district mills are somewhat better than last week. The

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.35
Black wire, base per 100 lb.	3.45

Lackawanna plant of the Bethlehem Steel Co. is operating 20 of 24 open-hearths, and the Donner Steel Co. has in use three 100-ton furnaces and one 200-ton furnace of nine; the Seneca Iron & Steel Co. is at about 70 per cent, and so is the Buffalo Bolt Co. Wickwire-Spencer operations remain at two open-hearths of four and the Gould Coupler Co. at three basic open-hearths and one acid furnace. Specifications are fair. Bids are in for school No. 82, on which the Felton Construction Co. is low. This involves 250 tons of reinforcing bars. The volume of bars for the new Erie, Pa., filtration plant will run heavier than previously reported, involving between 1000 and 1200 tons. A considerable volume of reinforcing bar inquiry is coming out.

Old Material.—The market continues to hold its strength without any new sizable buying. A small tonnage of stove plate was sold at $13. Shipments of heavy melting steel on contracts are now being made more liberally. Dealers are paying $15, Weirton, W. Va., for No. 2 steel and $16, Weirton, for stove plate. This demand is helping to divert considerable scrap, and dealers assert that stocks in their yards are now at a low point. Some cast iron borings sales and some sales of short shoveling mixed turnings for blast furnace use are noted at $11.50, and short shoveling turnings have been sold at a Niagara Frontier point at $13.

Prices per gross ton f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$14.50 to	$15.50
No. 2 heavy melting scrap		12.50
Scrap rails	14.75 to	15.25
Hydraul. comp. sheets		12.50
Hand bundled sheets	10.50 to	11.00
Drop forge flashings		12.50
No. 1 busheling	13.00 to	13.75
Hvy. steel axle turnings	13.50 to	14.00
Machine shop turnings	9.50 to	10.00
No. 1 railroad wrought	11.00 to	11.50
Acid Open-Hearth Grades:		
Knuckles and couplers	18.00 to	19.00
Coil and leaf springs	18.00 to	19.00
Rolled steel wheels	18.00 to	18.50
Low phos. billet and bloom ends	18.00 to	19.00
Electric Furnace Grades:		
Short shov. steel turnings	12.50 to	13.00
Blast Furnace Grades:		
Short mixed borings and turnings	11.00 to	11.50
Cast iron borings	11.00 to	11.50
No. 2 busheling		8.00
Rolling Mill Grades:		
Steel car axles	17.00 to	17.50
Iron axles	20.00 to	21.00
Cupola Grades:		
No. 1 machinery cast	14.50 to	15.00
Stove plate	12.75 to	13.00
Locomotive grate bars	10.50 to	11.00
Steel rails, 3 ft. and under	17.50 to	18.00
Cast iron carwheels	12.00 to	12.50
Malleable Grades:		
Industrial	16.50 to	17.00
Railroad	16.50 to	17.00
Agricultural	16.50 to	17.00
Special Grades:		
Chemical borings	12.00 to	12.50

Fabricated Structural Steel

Week's Awards of 19,000 Tons Lowest by Wide Margin in Several Weeks—Inquiries Total 17,000 Tons

STRUCTURAL steel contracting came to at least a temporary halt in the past week, when awards reported to THE IRON AGE totaled only 19,000 tons, the lowest amount by a wide margin in several weeks. New projects that came out for bids were likewise in small volume at about 17,000 tons. The awards included only a half-dozen jobs of more than 1000 tons. Among the new work, the largest project is 4000 tons for grade elimination work for the New York Central Railroad in New York City. Awards follow:

PORTLAND, ME., 450 tons, Portland Terminal Co. shed, to Blaw-Knox Co.

BOSTON & ALBANY RAILROAD, 100 tons, bridge repair work, to New England Structural Co.

NEW YORK, 700 tons, apartment building at Nineteenth Street and Irving Place, to Lehigh Structural Steel Co.

NEW YORK, 1000 tons, building for Hunter College, to Lehigh Structural Steel Co.

NEW YORK, 300 tons, building on Staten Island for Procter & Gamble Co.

NEW YORK, 300 tons, building for Department of Plant and Structures, reported to McClintic-Marshall Co.

NEW YORK, 400 tons, public school No. 138 in Queens, to Lehigh Structural Steel Co.

NEWARK, N. J., 2060 tons, Haynes Avenue viaduct, to American Bridge Co.

ALABAMA CITY, ALA., 1700 tons, sheet mill for Gulf States Steel Co., Virginia Bridge & Iron Co., 1000 tons, and Ingalls Iron Works, 700 tons.

BEAVER FALLS, PA., 600 tons, high school, to Guibert Steel Co.

PITTSBURGH, 300 tons, three barges for Monessen Coal & Coke Co., to Riter-Conley division, McClintic-Marshall Co.

WEIRTON, W. VA., 100 tons, wharf barge for Weirton Steel Co., to Midland Barge Co.

TOLEDO, OHIO, 225 tons, factory for Libby Owens Glass Co., to Flint Structural Steel Co.

HOCKING VALLEY RAILROAD, 1635 tons, two bridges, to Mount Vernon Bridge Co.

CHICAGO GREAT WESTERN, 700 tons, bridge work, to McClintic-Marshall Co.

CHICAGO, 400 tons, building for Walker Vehicle Co., to McClintic-Marshall Co.

MILWAUKEE, 500 tons, penstocks for Allis-Chalmers Mfg. Co., to an unnamed bidder.

ST. PAUL, 300 tons, highway bridge, to McClintic-Marshall Co.

GREEN BAY, WIS., 400 tons, auto shed for Milwaukee Road, to Wisconsin Bridge Co.

ST. LOUIS, 1000 tons, toll building for Southwestern Bell Telephone Co., to Mississippi Valley Structural Steel Co.

BAGNELL, MO., 2200 tons, dam construction bridge, to Mississippi Valley Structural Steel Co.

THACKERVILLE, OKLA., 700 tons, highway bridge, to Kansas City Structural Steel Co.

SASKATOON, SASK., 2200 tons, hotel for Canadian National Railways, to Dominion Bridge Co.

CALGARY, ALBERTA, 2000 tons, Post Office, to Riverside Iron Works.

SALINAS, CAL., 250 tons, including 40 tons of Junior beams, office building, to Judson-Pacific Co.

LOS ANGELES, 140 tons, two factory buildings on Pitt Street, to McClintic-Marshall Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

LYNN, MASS., 700 tons, high school.

CAMBRIDGE, MASS., 100 tons, Harvard faculty clubhouse.

QUEBEC, 500 tons, St. Charles River bridge.

NEW YORK, 400 tons, Warner Brothers' building on West Fifty-fourth Street.

NEW YORK, 400 tons, apartment building on West Twenty-first Street.

NEW YORK, 700 tons, office building in Bronx; bids being taken for general contract.

NEW YORK, 800 tons, public school No. 156 in Queens.

BROOKLYN, 6000 tons, building for Kings County Hospital; original bids for general contract rejected and new bids being taken.

NEW YORK CENTRAL RAILROAD, 4000 tons, grade crossing elimination at 158th Street, New York.

LONG ISLAND RAILROAD, unstated tonnage, grade crossing elimination at Ozone Park.

ELMIRA, N. Y., 200 tons, hospital.

WASHINGTON, 1000 tons, power plant for Stone & Webster, Inc.

CARNEGIE, PA., 300 tons, building for Superior Paper Products Co.

CLEVELAND, 380 tons, Nickel Plate Railroad bridge at East Ninety-third Street.

MANTENO, ILL., 500 tons, State building; bids in this week.

DETROIT, 1000 tons, Union League Club.

SOUTH CHICAGO AND PONCA CITY, 4000 tons, additions to refineries of Empire Oil & Refining Co.

DES MOINES, IOWA, 1900 tons, office building.

MILWAUKEE, 500 tons, Hibernia Avenue viaduct.

NEW WESTMINSTER, B. C., 500 tons, swing bridge for Canadian National Railways over Fraser River.

Corporation Improvements at Cleveland

The American Steel & Wire Co. has undertaken preliminary work for the improvement of the Newburgh Steel Works, Cleveland. Seven 80-ton open-hearth furnaces will be replaced by 11 100-ton furnaces and a new blooming mill will be installed. Plans also call for two bar mills.

Non-Ferrous Metal Markets

Copper Quiet and Firm—Tin Moderately Active—Lead Steady—Zinc Inactive

NEW YORK, Feb. 25.

Copper.—Very little improvement in demand is noted. The feature continues to be the steadiness of prices. Despite predictions from various sources, based upon nothing substantial, that prices will be reduced in the next month or two, there are no indications of any weakening and producers continue to assert that they do not expect any lower levels. Electrolytic copper is quoted at 18c., delivered in the Connecticut Valley, and 18.12½c. delivered in the Middle West, with the export price of Copper Exporters, Inc., 18.30c. c.i.f. usual European ports. Buying by domestic consumers continues in light volume and is confined to immediate needs only. Some consumers that formerly bought a carload at a time are only purchasing 5000 to 10,000 lb. at intervals. Some business is being done each day, and the encouraging feature is that purchases are more frequent. Reports from farbricators are that their bookings are quite satisfactory, particularly in the wire business. Sales abroad are maintaining the volume which has averaged for most of the month. Sales yesterday were over 1100 tons and this morning about 900 tons. The total for the month thus far is stated to be 29,000 tons, which is larger than for the same period in January. Consumers seem to be waiting for the February statistics, which will not be out for 10 days to two weeks. These are expected to be more favorable to producers than the January statistics. Lake copper is moderately active and firm at 18c. to 18.12½c., delivered.

Tin.—Sales for the past week have been moderate at about 500 to 600 tons, taken mostly by consumers. A good portion was spot delivery with considerable nearby metal involved. Practically no far futures are being purchased. An interesting feature is the large shipments to the United States of tin from Holland, the total the past week amounting to about 1500 tons as contrasted with 500 to 600 tons monthly. There are also liberal shipments from England of English and Straits tin. In spite of these large shipments, stocks in warehouses at London increased during the week 241 tons and are now 14,529 tons. Because of the large supplies of tin, prices today in London made a new low for some time, with spot

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Feb. 25	Feb. 24	Feb. 21	Feb. 20	Feb. 19
Lake copper, New York	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	38.12½	38.30	38.75	39.00	38.87½
Zinc, East St. Louis	5.15	5.15	5.15	5.15	5.15
Zinc, New York	5.50	5.50	5.50	5.50	5.50
Lead, St. Louis	6.10	6.10	6.10	6.10	6.10
Lead, New York	6.25	6.25	6.25	6.25	6.25

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 23.25c.
- Copper, hot rolled ..... 26.75c.
- Zinc ..... 10.50c.
- Lead (full sheets) ..... 10.00c.

Seamless Tubes—
- High brass ..... 28.25c.
- Copper ..... 29.25c.

Rods—
- High brass ..... 21.25c.
- Naval brass ..... 24.00c.

Wire—
- Copper ..... 19.87½c.
- High brass ..... 23.75c.

Copper in Rolls ..... 26.75c.
Brazed Brass Tubing ..... 30.87½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

	Base per Lb.
Sheets—	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.75c.
Lead, wide	10.30c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	21.25c.
Brazed Brass Tubes	31.00c.

New York or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brass Rods	18.87½c. to 19.87½c.
Brazed Brass Tubes	29.12½c. to 30.12½c.

New York Warehouse

Delivered Prices, Base per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.75c. to 11.25c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 40.00c. to 41.00c.
- Tin, bar ..... 42.00c. to 43.00c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 19.00c.
- Zinc, slab ..... 6.50c. to 7.50c.
- Lead, American pig ..... 7.00c. to 7.50c.
- Lead, bar ..... 9.00c. to 9.50c.
- Antimony, Asiatic ..... 11.00c. to 11.50c.
- Aluminum, No. 1 ingots for remelting (guaranteed over 99% pure) ..... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy ..... 24.00c. to 25.00c.
- Babbitt metal, commercial grade ..... 25.00c. to 35.00c.
- Solder, ½ and ½ ..... 26.75c. to 27.75c.

Metals from Cleveland Warehouse

Delivered Prices, Per Lb.

- Tin, Straits pig ..... 43.38c.
- Tin, bar ..... 45.38c.
- Copper, Lake ..... 19.50c.
- Copper, electrolytic ..... 19.25c.
- Copper, casting ..... 18.75c.
- Zinc, slab ..... 7.75c. to 8.00c.
- Lead, American pig ..... 7.00c. to 7.20c.
- Lead, bar ..... 9.25c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 18.00c.
- Babbitt metal, high grade ..... 46.50c.
- Solder, ½ and ½ ..... 28.25c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	14.75c.	16.25c.
Copper, hvy. and wire	14.50c.	16.00c.
Copper, light and bottoms	12.50c.	14.00c.
Brass, heavy	8.00c.	9.25c.
Brass, light	6.75c.	7.75c.
Hvy. machine composition	11.25c.	12.25c.
No. 1 yel. brass turnings	9.00c.	9.50c.
No. 1 red brass or compos. turnings	10.50c.	11.75c.
Lead, heavy	4.75c.	5.25c.
Lead, tea	3.75c.	4.25c.
Zinc	2.75c.	3.25c.
Sheet aluminum	11.00c.	13.00c.
Cast aluminum	10.00c.	12.00c.

standard quoted at £170 10s.; future standard at £173 10s. and spot Straits at £172 17s. 6d. The Singapore price today was also low at £176 10s. In a dull market today spot Straits tin is quoted at 38.12½c., New York.

Lead.—Demand is confined to carload and small lots for early delivery, with prices firm and unchanged at 6.10c., St. Louis. The American Smelting & Refining Co. continues to quote 6.25c., New York, as its contract price.

Zinc.—The interesting feature is the possible effect of a very much stronger ore market on the price of prime Western zinc. Thus far there has been no change in the latter, despite a very much firmer condition in ore. Prime Western zinc is quoted at 5.15c., East St. Louis, or 5.50c., New York, in a very quiet market. Ore is still quoted at $37, Joplin, but last week stocks were reduced to about 12,700 tons, or scarcely more than a week's supply from that district. Shipments were nearly 11,500 tons and production was only about 8800 tons. Reports are to the effect that the small surplus is now being held at $40 to $41 per ton. Should these prices be realized, it seems reasonable to expect that prime Western zinc may utlimately reach higher levels.

Antimony.—Prices are higher due to the uncertainty in the tariff situation and Chinese metal is quoted at 9c., New York, duty paid, for all positions.

Nickel. — Wholesale lots of ingot nickel are quoted at 35c. a lb., with shot nickel at 36c., and electrolytic nickel in cathodes at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at 23.90c. a lb., delivered.

OBITUARY

JACOB DOLSON COX, founder, long time president and later chairman of the board of the Cleveland Twist Drill Co., Cleveland, died Feb. 23 at his winter home in Pasadena, Cal., aged 77 years. He had been in failing health for two years. He was born in Warren, Ohio, and was the son of Gen. Jacob D. Cox, who served as major-general during the Civil War and later was governor of Ohio. Early in his career he was employed for seven years as a puddler, roller and in other capacities in a Cleveland rolling mill. In 1876 he formed a partnership with C. C. Newton, of Dunkirk, N. Y., for the manufacture of twist drills, which at that time was a new product of the tool industry. After operating a short time in Dunkirk the business was moved in the same year to Cleveland under the name of Newton & Cox. In 1880, Mr. Cox purchased Mr. Newton's interest and a little later took as a partner F. F. Prentiss, the name of the firm being changed to Cox & Prentiss. Business continued under that name until 1904 when the Cleveland Twist Drill Co. was incorporated. Mr. Cox retired from active business in 1918 leaving the direction of the company to his sons, Jacob D. Cox, Jr., now president, and Samuel H. Cox, vice-president, and his long time partner, F. F. Prentiss, also a vice-president. Mr. Cox was a member of a number of societies, including American Society of Mechanical Engineers, the Franklin Institute, the Society of Mayflower Descendants and the Loyal Legion.

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JOSEPH H. BRAGDON, publishing director of *Textile World*, died suddenly of pnuemonia Feb. 19, at New Rochelle, N. Y. He was a member of the executive committee and of the board of directors of the McGraw-Hill Publishing Co. and a past-president of the New York Business Publishers Association and a past-president of the Associated Business Papers, the latter office being the highest honor which the business publishing profession can offer. At

J. D. COX

the time of his death he was a member of the board of governors of the Advertising Federation of America. Mr. Bragdon was born in Melrose, Mass., June 9, 1887. His father, Joseph H. Bragdon, founded the *Textile Manufacturers Journal* in 1894. When the son graduated from Yale in 1911, he joined the staff of that publication. In 1915 he was active in a merger which established the *Textile World*.

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CHARLES F. BELLOWS, for the past 25 years or longer prominently identified with Arthur C. Harvey Co., Boston, and one of the best known men in the New England warehouse trade, died Feb. 17 at the Newton, Mass., hospital. He was the son of Charles F. Bellows, who years ago was one of New England's leading steel merchants.

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E. D. CAMPBELL, vice-president since 1892 of Beard, Campbell & Co., Port Huron, Mich., died on Feb. 4.

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LOUIS J. FELTES, general manager, D. J. Ryan Foundry Co., Ecorse, Mich., died suddenly Feb. 21, aged 43 years.

Reinforcing Steel

Iowa Highway Work Will Take 25,000 Tons

OF the 14,000 tons of reinforcing steel lettings the past week, 10,000 tons is for State highways in Iowa and 850 tons for New York subways. More than 18,400 tons was added to the pending list, State road work accounting for nearly 16,000 tons, of which 15,000 tons is for Iowa. Awards follow:

NEWINGTON, CONN., 400 tons, hospital, to a New York bidder.

BOSTON, 165 tons, Hupp Automobile Co. garage, to Concrete Steel Co.

NEW YORK, 450 tons, route 110, section 4, Brooklyn subway, to Concrete Steel Co.

NEW YORK, 400 tons, route 108, section 5, Queens subway, to McClintic-Marshall Co.

NEW YORK, 125 tons, Walton High School, to Carroll-McCreary Co.

NEW YORK, 300 tons, Maternity and Psychopathic Hospital, to Carroll-McCreary Co.

PHILADELPHIA, 1500 tons, Hoyt Street sewer, to Truscon Steel Co.

PHILADELPHIA, 200 tons, State road sewer, to Truscon Steel Co.

STATE OF IOWA, 10,000 tons, State road work, to various bidders.

CHICAGO, 150 tons, hospital for University of Chicago, to an unnamed bidder.

SEATTLE, 250 tons, apartment building at Spring and Miner Avenue, to Pacific Coast Steel Corporation.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 400 tons, telephone exchange.

LEXINGTON, MASS., 200 tons, hospital addition.

LYNN, MASS., 200 tons, school.

STATE OF IOWA, 15,000 tons, State highway work.

CHICAGO, 600 tons, Commonwealth Avenue service station, for Commonwealth Edison Co.

CHICAGO, 400 tons, addition to Hotel Morrison.

CHICAGO, 450 tons, apartment building on Barry Avenue; previously reported as 200 tons.

MILWAUKEE ROAD, 300 tons, miscellaneous requirements.

JOLIET, ILL., 100 tons, addition to Rockdale station of Public Service Co. of Northern Illinois.

JEFFERSON CITY, MO., 500 tons, highway projects for Missouri Highway Commission; bids opened Feb. 28.

SACRAMENTO, 192 tons, highway work in San Joaquin County; bids March 12.

SACRAMENTO, 120 tons, bridge in San Joaquin County; bids March 12.

PERSONAL

Armco Men Sail to Operate New Unit

M. E. DANFORD, assistant vice-president, American Rolling Mill Co., Middletown, Ohio, will sail for England March 5, where he will supervise work preparatory to starting operations at the new Armco unit, the specialty steel division of the John Summers & Sons Co., Ltd., Shotton Works of Shotton, Chester, England. He plans to return next summer.

WILLIAM HOOVER, who has been with the company since 1904, has been selected as plant manager. He joined Armco as a pull-up in the open-hearth department in 1904. He was assistant superintendent at Middletown and later assistant superintendent and superintendent of the sheet mill department at Ashland. In 1928, he was sent to Butler, Pa., as assistant to the vice-president of the Columbia division. One year later he was made manager of Armco's plant at Elyria, Ohio. Early this year, he returned to Middletown and since that time has been associated with Armco International Corporation.

BERNARD DRAUT will go to the Shotton plant to familiarize British workmen with Armco's rolling practices. He has been continuously engaged in sheet mill work for more than 20 years, joining Armco in 1906.

C. A. WOLFE, foreman of strip cold rolling at the Butler plant, will go over to supervise the cold rolling. This is Mr. Wolfe's second trip abroad. He recently returned from an assignment in France and Great Britain. Mr. Wolfe has been connected with processing operations in Armco's Butler, Middletown and Ashland plants since 1912.

E. J. GOLDSCHMIDT, statistician and head of the statistical department, is another of the group going over at the present time. He will set up the cost work and remain in England until the new cost system is established.

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B. B. HOOD, heretofore chief engineer of the American Chain Co., Bridgeport, Conn., has become assistant to the general superintendent of the Procter & Gamble Mfg. Co., Port Ivory, Staten Island, N. Y.

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C. K. WEHN has resigned his position as Pittsburgh district manager of the H. K. Ferguson Co. to become vice-president and general sales manager of the Pennsylvania Fabrication Co., Verona, Pa., with sales offices at 1202 Peoples Bank Building, Pittsburgh.

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FRANK J. WARD, for the past nine years in charge of the steel mill division of Cutler-Hammer, Inc., Milwaukee, has been made manager of the Philadelphia office, succeeding T. E. BEDDOE, who has resigned. Mr. Ward has been identified with the Cutler-Hammer company continuously for the past 30 years, with the exception of two years during the war period when he was electrical engineer for the Midvale Steel & Ordnance Co.

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H. H. HARRIS, president, General Alloys Co., Boston, has been elected to the board of directors of Aviation Consolidated, Inc.

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W. M. STEVENSON, who has been connected for the past 20 years with the railroad department in Cleveland of the Crucible Steel Co. of America, has been appointed district representative, with offices at 412 Rockford National Bank Building, Rockford, Ill.

SAMUEL N. SUMMER has been elected president of the Joseph Schonthal Co., Columbus, Ohio, iron and steel products. D. C. SCHONTHAL has been made vice-president, and MATHER MOFFETT, secretary.

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L. FORD MERRITT has been made manager of the Detroit office of the Union Chain & Mfg. Co., Sandusky, Ohio.

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HYMAN BORNSTEIN, chief chemist and metallurgist, Deere & Co., was scheduled to address the Quad-City Foundrymen's Association, Feb. 24, at the Chamber of Commerce Building, Davenport, Iowa, on factors affecting quality in the foundry.

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CHARLES N. STEVENS has resigned as general manager of the Kenosha Boiler & Structural Co., Kenosha, Wis., to become general manager of the Milwaukee Boiler Mfg. Co., Milwaukee. W. D. Johnson, president and general manager of the Milwaukee company, died some time ago. Mr. Stevens is a graduate in mechanical engineering of Rose Polytechnical Institute at Terre Haute, Ind. He was associated with the Kenosha plant for six years.

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OTTO R. ROENIUS, vice-president of the American Carbonic Machine Co., Wisconsin Rapids, Wis., has resigned to engage in investment banking. He became connected with the company, then known as the Grand Rapids Foundry Co., founded by his father, in 1898. Manufacture of ice machines became its principal business and some years ago the present name was adopted. Until a few years ago Mr. Roenius was president and general manager.

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JAMES LAWRIE, research chemist, Memphis, Tenn., has joined the research staff of the A. O. Smith Corporation, Milwaukee. He formerly was identified with the International Harvester Co.

M. E. DANFORD

W. HOOVER

B. DRAUT

C. A. WOLFE

E. J. GOLDSCHMIDT

D. S. SAMPSON has been assigned to the New Jersey territory of the A. M. Byers Co., Pittsburgh, with headquarters at the company's New York office. R. C. HAMLETT, IRWIN P. YOUNG and T. D. GRAHAM have been added to the company's sales organizations in the New Orleans, Chicago and St. Louis territories respectively.

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E. D. LEMAY, for several years secretary to George Gordon Crawford, formerly president of the Tennessee Coal, Iron & Railroad Co., Birmingham, has been promoted to the position of assistant to the new president, HERBERT C. RYDING.

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FRED W. DUMLER has been elected a vice-president of the Walworth Co., Boston, and will be in charge of sales to oil and power industries.

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GEORGE S. WEBSTER, assistant to the general manager of the Atlantic works, East Boston, Mass., Bethlehem Shipbuilding Corporation, was tendered a dinner, Feb. 20, at the Atlantic works on the completion of 50 years of service with the company. He entered the employ of the Atlantic Works, Jan. 13, 1880, in the machine shop. Subsequently he was made superintendent, continuing in that position until July, 1928, when the plant was absorbed by the Bethlehem interests. Mr. Webster has the distinction of being the only non-railroad man to have ever held the presidency of the New England Railroad Club.

—

W. C. MINIER, formerly with the Shepard Crane & Hoist Co., and F. C. LORENZ, for some years with the Cleveland Electric Tramrail, have been added to the sales and engineering staff of the Cleveland office of Reading Chain & Block Corporation, Reading, Pa.

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EDWARD C. MADISON, formerly with Wilson Welders & Metals Co., has been appointed vice-president of Prest-O-Sales & Service, Inc., Long Island City, N. Y., distributer of welding equipment and supplies.

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E. E. THUM, associate editor, THE IRON AGE, addressed a meeting of the New Haven Chapter of the American Society for Steel Treating held at Hammond Laboratory, Yale University, on Feb. 20. His subject was "New Manganese Alloy Steels."

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FRANK J. VOGEL, formerly in charge of the standards department of the R. D. Nuttall works of the Westinghouse Electric & Mfg. Co., has been appointed chief inspector of the Thomas Spacing Machine Co., Pittsburgh, builder of fabricating machinery.

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JOEL LARSSON, chief metallurgist, SKF Hofors Steel Works, Hofors, Sweden, is spending several months in the United States. Last week he attended the annual convention of the American Institute of Mining and Metallurgical Engineers.

EDMOND STINNES, son of the late Hugo Stinnes, returned to Germany, Feb. 21, after spending some time in the United States looking after various Stinnes interests.

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A. J. GLOYD, assistant to the vice-president and managing director of Armco International Corporation, has also been made manager of sales for the corporation. He joined Armco in

A. J. GLOYD

1912 and in 1920 was transferred to the export department, which was later taken over by Armco International Corporation.

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JOHN HICKEY has again joined the engineering staff of the National Pipe Bending Co., New Haven, Conn., and will have charge of engineering in connection with research and new product development.

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H. E. FOOTE is the recipient of the fellowship on oxygen awarded by Mellon Institute of Industrial Research, Pittsburgh, and his work will include the study of the application of oxygen to metallurgical operations.

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ROBERT H. FERNALD, Whitney professor of dynamical engineering and director of the mechanical engineering department of the University of Pennsylvania, Philadelphia, has been appointed dean of the Towne Scientific School of the university.

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GEORGE W. TRUXAL has been appointed sales manager of the Chemical department of the Cleveland-Cliffs Iron Co., to succeed the late Charles B. Hall. He has been with the company since 1908.

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Progress in the use of high-pressure steam is to be discussed at the meeting of the American Society of Mechanical Engineers on the evening of March 25 at the Engineering Societies Building, New York, by J. B. Crane, high-pressure specialist, Combustion Engineering Corporation, New York.

Railroad Equipment

Pacific Fruit Express May Buy 1500 to 3000 Cars

ACTIVITY in the railroad equipment market has come to a rather abrupt halt in the past two weeks. Except for the pending inquiry of the Seaboard Air Line for 2000 tons, not much prospective work is definitely in the market. It is reported, however, that the Pacific Fruit Express may soon inquire for 1500 to 3000 refrigerator cars.

Railroad car companies are of the opinion that very little new business will develop before May or June, the figures on car loadings not being impressive enough to encourage the railroads to buy more equipment at this time. Details of the week's business follow:

Erie Railroad is inquiring for 10 switching locomotives with tenders and five additional tenders.

Maine Central is inquiring for one or two 4-6-4 locomotives.

Toronto, Hamilton & Buffalo is in the market for two eight-wheel switching locomotives.

Youngstown Sheet & Tube Co. is inquiring for 12 flat cars, in addition to 80 gondola car bodies.

Pullman Co. has ordered 100 general service cars from Pullman Car & Mfg. Corporation.

Southern Pacific has ordered 10 baggage cars from Pressed Steel Car Co.

Chicago, Rock Island & Pacific is inquiring for five baggage cars. It has ordered four parlor cars and 10 coaches from Pullman Car & Mfg. Corporation.

Louisville & Nashville is inquiring for 23 items of passenger train equipment.

Pacific Fruit Express may soon enter the market for 1500 to 3000 refrigerator cars.

Office Changes

Detroit offices of Forgings & Castings Corporation, maker of hammered forgings, have been moved from Michigan Avenue and Vernor Highway to 2411 Fourteenth Street.

Geometric Tool Co., New Haven, Conn., specializing in machinery for cutting screw threads, has opened a Detroit sales office at room 315B, Stormfeltz-Loveley building, Woodward Avenue at Grand Boulevard. Charles A. Strelinger Co., Detroit agent for the Geometric line, will continue to handle it.

Detroit offices of Electric Machinery Mfg. Co., Minneapolis, Minn., are now located at 10-230 General Motors building.

New York district sales office of Easton Car & Construction Co., Easton, Pa., has been moved to 10 East Fortieth Street.

Metal Finishers' Machine Co., Cleveland, manufacturer of grinding, polishing and buffing machinery, has moved its factory and general offices from 1931 West Forty-seventh Street to larger quarters at 2231 West Sixty-first Street.

Book Reviews

(*Continued from page* 656)

interesting discussion of a few of the many unique designs in aircraft engines.

This second volume offers a great deal of information not only to the operator, but to the designer and builder, by giving to them under one cover, pictures and descriptions of many kinds of engines. I believe that this book of Major Pagé's will fulfill a very great want in teaching the subject of aviation engines.

I. W. STEPHENSON.

Short Manual on Iron and Steel

Kurzgefasste Eisenhüttenkunde. By B. Osann. 184 pages, 5¾x8 in., 138 illustrations. Max Jäncke, Leipzig, Germany. Price 11.40 marks.

This little book on the metallurgy of iron, written in highly condensed form, is intended primarily for those who have only a slight acquaintance with chemistry and engineering. Prof. Osann has spent his active life in the chair of metallurgy at the Mining Academy of Clausthal, and has a world-wide reputation. Hence the book in question is strictly up to date, correctly laid out, comprehensive (despite its brevity) and so well illustrated as to emphasize the value of replacing pages of reading matter by a diagrammatic representation of the subject.

The book can be highly recommended, to those who are familiar with the German language, as a very handy reference book covering every important commercial phase of iron and steel-making as well as foundry procedure.

RICHARD MOLDENKE.

Critical Review of the Knowledge About Inclusions

Impurities in Metals, Their Influence on Structure and Properties. By Colin J. Smithells. 157 pages, 6¼x9¾ in., 166 figures and 27 tables. John Wiley and Sons, Inc. Price $5.

The author is a member of the research department of the English General Electric Co., and has already published an excellent book on tungsten. The first four chapters of his present book are introductory in character, in which he reviews the methods of studying the structure of metals, and then deals more in detail with X-ray examination of metals. The clear discussion of crystallography and Laue diagrams is needed because much of the later discussion is based on atomic arrangement of metals and alloys.

From Chapter 5 onward the author really tackles his subject, first dealing with the influence of minor constituents on structure, mechanical properties, electrical properties and corrosion. By minor constituent he means up to about one per cent—which is a high percentage for steel but is probably admissible for many non-ferrous alloys. The minor constituents are divided into metallic, non-metallic and gaseous. The method of treatment is very suggestive of Jeffries and Archer's "Science of Metals" in that much of the available knowledge is brought together, clearly discussed and conclusions reached when such are possible. All branches of metallurgy are drawn upon, commercially pure metals such as tungsten, alloys of many kinds, cast iron, tool steels and alloy steels. The sections on the influence of gases in metals and on the magnetic properties of iron are very good, the latter being largely based on the work of Yensen. The chapter on corrosion is also good, but it seems strange that no mention is made of the influence of small amounts of copper in helping steel to resist atmospheric corrosion. The author appears to be unacquainted with Speller's excellent volume on corrosion.

It is a book chiefly for research workers and students of metallography and can be recommended without reservation because of the good material it contains and its thought-provoking discussions.

G. B. WATERHOUSE.

Heat Transfer

Industrial Heat Transfer. (Der industrielle Wärmeübergang). By Dr. A. Schack. 408 pages, 5½x8 in., 41 illustrations. Stahleisen, Düsseldorf, Germany. Price 18.50 marks.

Here is a book that states in a lucid and well-arranged manner the various heat transfer formulae that heretofore were scattered through the literature of many countries, the derivation of the various formulae, and some heretofore unpublished material. Furthermore, it critically discusses the range of applicability of the different formulae.

The book treats of conduction, convection, and radiation. It considers constant and variable heat flow, simple and composite walls, parallel flow, cross-flow, and counter-flow, heat transfer from condensing vapors; recuperators and regenerators, luminous and non-luminous flames, heat transfer in boilers, radiation through openings. Last, not least, Dr. Schack's book contains almost 20 pages of well selected physical constants such as thermal conductivity, density, specific heat, viscosity, and radiation coefficients.

All formulas are derived from first principles, and the reliability of experimental coefficients is critically discussed at the hand of all available data. The author has done fairly well in utilizing international data, although German experimenters, quite naturally, predominate. Dr. Schack is well known for his work on the radiation of gases and flames.

An early translation of Dr. Schack's work is very desirable, because there is no book in the English language now available that offers engineers just what they need in heat transfer. The book should find a ready market among mechanical engineers (including automotive and refrigerating engineers) chemical engineers, and metallurgists. Heating and ventilating engineers will, likewise, find many valuable hints, particularly in the study of the relations between heat transfer and pressure drop in pipes.

W. TRINKS.

Workers as Rational Beings

Psychology and Industrial Efficiency. By Harold Ernest Burtt, Ph.D. 395 pages, 5x8 in. D. Appleton & Co., New York. Price $3.

Many books are money's worth, but this is better still—it's time's worth. It dissociates psychology from mere selling problems alone, and applies it most thoroughly to the industrial field. It first handles the question of education in industry, giving the fundamental principles of learning, with the laws of use (or frequency) and disuse (or recency) and effect; then takes up the course of practice and the use of practice curves and of special devices for industrial instruction; and goes very thoroughly into training of apprentices, foremen, and salesmen.

The chapter on fatigue, both subjective and objective, is about the first of which I know that distinguishes properly between fatigue and weariness, and discusses under "mental fatigue" the effects of motivation and those on metabolism and retention. In these days of almost world-wide campaigns against unnecessary and harmful

noises, the paragraphs devoted to this topic deserve quotation in the daily papers and the technical periodicals.

The importance of working environment is handled concretely and satisfactorily. And *a propos* of satisfaction, Chapter VII treats of that and *morale*; laying down the cause of dissatisfaction and the importance of proper placement. Efficiency in executive work, discusses the factors of attention, memory, habit-formation, and interest.

This book should be read at least twice, and kept handy for reference.

ROBERT GRIMSHAW.

New Books Received

The Five-Day Week in Manufacturing Industries. 69 pages, 6 x 9 in. Published by National Industrial Conference Board, Inc., 247 Park Avenue, New York. Price $1.50.

General Sales or Turnover Taxation. 204 pages, 6 x 9 in. Published by National Industrial Conference Board, Inc. Price $2.50.

Transactions of the American Institute of Mining and Metallurgical Engineers, 1929. 410 pages, 6¼ x 9¼ in., illustrated. Published by the society, 29 West Thirty-ninth Street, New York.

Public Regulation of Competitive Practices. Second edition, revised. 320 pages, 6 x 9 in. Published by National Industrial Conference Board, Inc. Price $3.

Mechanical World Year Book, 1930. 348 pages, 4¼ x 6¼ in., illustrated. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Price 1s. 6d.

Employee Thrift and Investment Plans. 114 pages, 6 x 9 in. Published by National Industrial Conference Board, Inc. Price $1, paper binding.

Transactions of the American Foundrymen's Association, 1929. 751 pages, 6 x 9¼ in., illustrated. Published by the association, 222 West Adams Street, Chicago.

Public Education as Affecting the Adjustment of Youth to Life. 61 pages, 6 x 9¼ in. National Industrial Conference Board, Inc. Price $1.50.

Year Book of the American Iron and Steel Institute—1929. 476 pages, 6 x 9½ in., illustrated. American Iron and Steel Institute, 75 West Street, New York.

Cleans Castings with Water Jet

CLEANING castings of mold and core sand by strong water jets is a method which seems now to be attracting attention in France, where one or two such installations have been made. The casting is placed in a cleaning room and the hydraulic jet is directed through openings in the wall. Water pressure is about 700 lb. per sq. in. In one instance, a hydraulic press casting weighing 1¾ tons was cleaned in 2 hr. as against 8 hr. required by manual labor. A pump casting of about the same weight was cleaned in 2½ hr. as against 18. Other complicated castings making a total weight of 11 tons were cleaned in 8½ hr. as against 56 hr. by hand, a ratio of 1 to 6½. Seven thousand gallons of water was necessary for the work described.

A 12-story office building is under construction for the Southern California Edison Co. at Los Angeles, Cal., which will contain approximately 3600 tons of steel. All of the wind bracing and seismic bracing is to be arc welded. Welding of other details will make this building a 75 per cent arc welded job.

Foundries Use Gas for Annealing

(*Concluded from page* 639)

report that convinced the management that the latter type was superior.

Electric furnaces were considered. It was found by comparison that the gas furnace would anneal two charges to every one treated in an electric. The energy consumption of two electrics considered were 300 kw. and 315 kw. respectively, as against a fuel use of 4800 cu. ft. of gas per ton of work. Using varying rates the comparative fuel and energy costs of annealing would be as follows:

A Milwaukee Steel Foundry

Electric Rate	Consumption	Cost Per Ton
$0.02 per kwhr.	315	$6.30
0.015	315	4.725
0.014	315	4.410
0.013	515	4.095
0.012	315	3.78
0.011	315	3.465
0.010	315	3.15
0.0095	315	2.9925
0.0090	315	2.835
0.0085	315	2.68
0.0080	315	2.52

Link Belt Company

Gas Rate	Consumption	Cost Per Ton
$1.00 per M cu. ft.	4,800 cu. ft.	$4.80
0.90	4,800	4.22
0.80	4,800	3.84
0.70	4,800	3.36
0.60	4,800	2.88
0.55	4,800	2.64
0.54	4,800	2.59
0.53	4,800	2.54
0.52	4,800	2.49
0.51	4,800	2.44
0.50	4,800	2.40

The table covers fuel and energy costs alone and without taking into consideration other factors detailed in the body of this article.

Taking another example, four heats were put through the gas furnace at Link Belt and 79,318 lb. of castings, or approximately 40 tons of castings, were annealed with a gas consumption of 4000 cu. ft. per ton. Now, the best that could be done with an electric furnace was 20 tons in the same time period. With a gas rate of, say, 60c. per 1000 cu. ft., the cost would be $2.40, as against the electric equipment taking 300 kwhr. a ton at 0.01c. per kwhr., or $3 per ton. On this basis the gas furnace could produce 40 tons of castings at a cost of $96, against a cost of $60 for 20 tons from the electric furnace.

An Important New Metal for Aircraft

Beryllium is of greatest interest to aircraft manufacturers because the strength-weight ratio is two or three times that of hardened aluminum, according to Dr. W. Rosenhain of the British National Physical Laboratory. In a lecture before the Royal Aeronautical Society he said that the cost of producing the metal is high, but this is largely due to the fact that beryllium-bearing minerals are priced at much too high a figure. New sources of ores are constantly being discovered, however, and it might be that the price of beryllium would come down to about twice that of tin. It was interesting to recall, in passing, that tungsten, which, at one time, was a chemical curiosity, is now a good deal cheaper than chromium. So far, metallurgists have been unable to produce a ductile specimen of beryllium, but this peculiarity is probably due to impurities in the metal and to defects in the processes of manufacture. It has been found that an addition of only 3 per cent of beryllium to copper greatly increased the elastic modulus of that metal.

The first electrically-welded building in Boston will be built within the next few months by Boston Edison Co. It will be a 14-story store and office building, 60 ft. wide, 112 ft. deep and 155 ft. high. The steel skeleton will weigh 1200 tons, and all field joints will be welded.

Dullness Grows in European Markets

Britain and Germany Find Trade Slackness Increasing—French Domestic Demand Is Better—Tin Plate Prices Cut by Outsiders

(*By Cable*)

LONDON, ENGLAND, Feb. 24.

PIG IRON is dull with consumers awaiting lower prices as production costs have been further reduced, but makers are unwilling to pass on the saving. Consequently, the order of the Scottish Light Castings Association for 10,000 tons of foundry iron is temporarily withheld.

Hematite output is exceeding demand and furnaces are reaching the end of substantial contracts secured in the closing months of last year. Early blowing out of furnaces appears unavoidable unless there is rapid improvement in demand.

Finished iron and steel markets are dull with export sales meager. As a result, mills are moderately well engaged, but lack new business. Domestic demand has eased as shipbuilding has become quieter.

The Continental market here is decidedly inactive, as buyers are unwilling to pay the increased prices fixed by the cartel.

Tin plate is dull except for a fair volume of inquiry, but as a result of the pooling plan mills are well situated. Sellers of tin plate, not participating in the restriction of output and using foreign steel are accepting 18s. 3d. ($4.44) per base box f.o.b. works port, but others are quoting 18s. 6d. to 18s. 9d. ($4.50 to $4.56) per base box.

Galvanized sheets are quiet and prices have eased, with mills in need of orders. Makers are meeting Wednesday, when a minimum price for galvanized sheets may be reestablished. Japan is showing some interest in light gage black sheets, but business is generally quiet.

The Belgian State railroads have placed an order for 26,000 tons of rails with Belgian and Luxemburg mills.

German Steel Trade Depressed

Renewal of Syndicates Has Not Increased Buying—Export Rebate System May Be Revised to Cash Payments

BERLIN, GERMANY, Feb. 4.—Steel business has been quiet in the past fortnight and the successful renewal of the domestic syndicates has failed to bring about an expected improvement in buying. Some of the smaller steel mills have been reducing their working forces and foundries report little new business. Railroad permanent way material is quiet, with the Railroads Corporation withholding contracts, and demand for structural steel is small, but expected to improve with the beginning of spring building. A favorable feature of the present situation is the lack of large stocks in dealers' warehouses or among consumers.

Quotations of the domestic syndicates for February are unchanged, but the price rebates of the Ingot Steel Syndicate to exporting manufacturers have been slightly increased on certain products. The rebates for February are 16 m. ($3.82) per ton on ingots; 23 m. ($5.50) on billets, blooms and slabs; 36 m. ($8.60) on structural shapes; 34 m. ($8.12) on bars; 42 m. ($10.04) on bands; 21.50 m. ($5.14) on wire rods, and 28 m. ($6.69) on thin-gage sheets.

Negotiations between the Ingot Steel Syndicate and the Association of Manufacturers for a revision of the rebates system have not been concluded. It has been suggested that the syndicate should pay these rebates in cash instead of giving certificates for use as payment on future purchases. The syndicate is seeking to bind manufacturers to purchase all material from it, or from such dealers as buy syndicate material exclusively. In addition, it is endeavoring to limit the rebates to material used in the production of finished products which the manufacturers, themselves, export.

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp, with the £ at $4.8665 (par)

British Prices f.o.b. United Kingdom Ports

Cleveland No. 3 foundry	£3	12½s.	to	£3	13½s.	$17.64	to	$17.88
East Coast hematite...	3	18	to	3	18½	18.98	to	19.10
Ferromanganese, export	12	5	to	12	10	59.61	to	60.83
Billets, open-hearth....	6	2½	to	6	12½	29.81	to	32.24
Sheet bars, open-hearth	5	17½	to	6	5	28.59	to	30.42
Black sheets, Japanese specifications	12	5				59.61		
Tin plate, per base box	0	18¼	to	0	18¾	4.43	to	4.55
Rails, 60 lb. and heavier	7	15	to	8	15	37.72	to	42.58
						Cents a Lb.		
Steel bars, open-hearth.	8	0	to	8	10	1.74	to	1.85
Beams, open-hearth....	7	7½	to	7	17½	1.60	to	1.71
Channels, open-hearth.	7	12½	to	8	12½	1.66	to	1.87
Angles, open-hearth....	7	7½	to	7	17½	1.60	to	1.71
Ship plates, open-hearth	7	15	to	8	5	1.68	to	1.79
Black sheets, No. 24 gage	9	15	to	10	0	2.12	to	2.17
Galvanized sheets, No. 24 gage	11	7½	to	11	10	2.38	to	2.49

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3	6s.	to	£3	10½s.	$16.06	to	$17.15
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3	4	to	3	5	15.58	to	15.82
Billets, Thomas.....	4	13	to	4	14	22.63	to	22.87
Sheet bars, Thomas...	4	13	to	4	15	22.63	to	23.12
Wire rods, low C., No. 5 B.W.G.....	6	2	to	6	4	29.69	to	30.19
Rails, 60 lb. and heavier	6	8½	to	6	10*	31.27	to	31.63
Rails, light	6	0				29.20		
						Cents a Lb.		
Steel bars, merchant...	5	7½				1.18		
Steel bars, deformed...	5	6½				1.17		
Beams, Thomas, British standard	5	3	to	5	6	1.12	to	1.17
Channels, Thomas, American sections...	5	12	to	5	14	1.24	to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick.....	5	6				1.17		
Angles, Thomas, 3-in...	5	7½				1.18		
Ship plates open-hearth inspected	7	3	to	7	5	1.56	to	1.60
Black sheets, No. 31 gage, Japanese	12	2	to	12	3	2.67	to	2.68
Hoop and strip steel over 6-in. base.....	5	15	to	5	17½	1.25	to	1.28
Wire, plain, No. 8 gage	6	10				1.42		
Wire, galvanized, No. 8 gage	8	5				1.79		
Wire, barbed, 4-pt. No. 12 B.W.G.....	10	17½				2.36		
Wire nails, base.....	7	0				$1.55 a keg		
Wire nails, assortments 1 to 6-in. keg.....	10	5				2.22		

*Open-hearth steel, 8s. ($1.95) a ton extra.

New Leader Appears in Steel Trade of Germany

BERLIN, GERMANY, Feb. 4.—The acquisition of smaller steel producers by the larger interests and mergers of plants of about equal importance, which began when the domestic syndicates were renewed, are continuing. Negotiations among the Charlottenhütte A. G., Otto Wolff & Co., Cologne, and the Vereinigte Stahlwerke A. G., Düsseldorf, are reported virtually concluded and will probably give Director General Flick of the Charlottenhütte A. G. and Otto Wolff a majority interest in the Vereinigte Stahlwerke.

At its meeting, Feb. 28, the shareholders of the Vereinigte Stahlwerke will act on a proposal to add to the board of directors Ottmar Strauss, partner of Otto Wolff, Dr. Sintenis of the Berlin Handelsgesellschaft Bank, Director Moritz Schultze of the Commerz und Privatbank, Baron von Oppenheim and H. von Stein, banker. Director General Flick already controls 40 per cent of the capital of the Vereinigte Stahlwerke, has control in the Gelsenkirchener Bergwerks and will now acquire control of the shares of Otto Wolff in the Phoenix A. G., a subsidiary. Director General Flick is president of the board of supervision of the Central German Steel Corporation and he is a dominant figure in the eastern German steel business. In consequence of the pending transfer of control, he will become one of the most influential men in the German steel industry.

Italian Car Builders Form Export Syndicate

ROME, ITALY, Feb. 3.—Railroad car builders in Italy have formed the Consorzio Italiano Exportazione Veicoli Ferroviariie Tramviarii, with headquarters at Milan. Most of the important car builders are members of the association, which will act as an export syndicate, with agencies in all principal markets. An effort will be made to increase export business, especially with South American countries, from which orders have recently been booked.

French Trade Improving —New Liner Planned

BORDEAUX, FRANCE, Feb. 4.—Expected improvement in domestic demand appears to be starting. Orders for large tonnages of iron and steel are generally lacking, but some important inquiries have been made, and the market is firm, with advances announced on certain products. Demand for pig iron is active, stocks are low, and in many instances sellers are three months behind on deliveries.

Award of several important contracts for railroad rolling stock is expected shortly. A new trans-Atlantic liner of the *Ile de France* type, the largest vessel under the French flag, is now being constructed, and the keel of another will shortly be laid. Exports of iron and steel show no change, but competition from Britain is keen.

Imports of non-ferrous metals are active, and one consumer alone is taking 100 to 200 tons of copper a week for the manufacture of sulphate. A new factory for the manufacture of copper sulphate is now being constructed at Bordeaux and, when in operation, will require a similar tonnage of the metal, although this rate of consumption will not be maintained throughout the year.

Reparations Aid German Chain Exports

HAMBURG, GERMANY, Feb. 10.—Rather striking proof that increased trade for Germany is following the reparations deliveries when an industry follows up these shipments with an advertising campaign appears in the exports of ship and anchor chains. Prior to the war such exports were negligible, with only 387 tons sold abroad in 1913. At that time the British supplied most of the world market.

Following the war, reparations deliveries were made to practically all shipbuilding countries which were signers of the Treaty of Versailles, so that German ship and anchor chains were introduced to many new users. By 1926 German exports of anchor and other chains reached a total of 2900 tons, of which about 50 per cent went on reparations deliveries. With deliveries on reparations representing a steadily decreasing percentage of the total, until they reached 405 tons in 1929, exports of chains advanced to 3600 tons in 1927, to 4100 tons in 1928 and to 4988 tons in 1929.

Motor-Car Expansion

WASHINGTON, Feb. 25.—Making a gain of about 128 per cent, production of motor vehicles in the United States in January totaled 273,089 units, against 120,004 in December, according to reports received by the Department of Commerce from 144 manufacturers. The increase in passenger car output was 153 per cent, rising to 234,527 units from 91,235. Truck production in January was 37,990, compared with 27,286, and taxicab output declined to 572 from 1483.

Canadian production of motor vehicles in January increased to 10,388 from 5495 units. Passenger car output was 8856, compared with 4426, while truck production was 1532, against 1069.

Compared with the 401,037 vehicles turned out in the United States in January, 1929. last month's production was off 32 per cent, shared in by both passenger cars and trucks, but not equally. Passenger cars were down 33 per cent and trucks 27 per cent. Taxicabs were 72 per cent less than a year ago. Canadian production in January was less than one-half that of a year earlier.

Almost All German Mills in Steel Syndicate

BERLIN, GERMANY, Feb. 4.—With recent additions to the membership of the Ingot Steel Syndicate, the entire German steel industry, except for a few unimportant works, is included. Mills controlled by the Thyssen interests, hitherto outsiders, have become members, and a number of small producers are negotiating for membership.

A medium-gage sheet syndicate was established Jan. 17, and will operate as an adjunct of the heavy sheet syndicate. In the past there has been a price agreement for medium-gage sheets, but not an actual organization. Producers of light-gage sheets have no syndicate or price agreement, but have established a new central selling office, which operates as a limited liability company. Negotiations have been instituted for the formation of a syndicate, but no agreement has been reached on the question of export control by such an association. Certain of the leading producers of light-gage sheets, such as the Hoesch Steel Works, are understood to be opposed to export control, as it would be likely to lead to price advances, which would meet with opposition from manufacturing consumers.

Cartel Price Policy Turns Exporters to Poland

HAMBURG, GERMANY, Feb. 10.—The policy recently adopted by the International Steel Cartel of granting only a 1s. (24c.) per ton reduction in price to exporters and merchants is meeting with considerable opposition, as the merchants contend that it provides too small a profit. As a result Polish steel mills have received an unusually large volume of steel inquiry and are quoting on most of this business, because of slackness in the Polish domestic market. However, it is not expected here that Poland will sell more than about 15,000 tons of steel a month to these new customers, in view of higher prices obtainable from buyers in Rumania, Bulgaria and other near Eastern countries.

Germans Consume Less Non-Ferrous Metal

HAMBURG, GERMANY, Feb. 10.—Imports of all non-ferrous metals into Germany in 1929 reached a total of 504,700 tons, a decrease of 55,000 tons from the 1928 total. Exports increased from 93,100 tons in 1928 to 107,700 tons in 1929, not including finished products. The import surplus of copper has shown a steady decrease in the past few years. In 1927 the surplus of copper imports over exports was 222,000 tons; in 1928 it was 205,000 tons, and in 1929, 162,000 tons. A further decline in the surplus this year would not be unexpected.

Wire Rod Cartel Quota Larger for Quarter

WASHINGTON, Feb. 21.—The production quota of the Wire Rod Cartel for the first quarter of 1930 has been increased 10,000 tons to 485,000 tons, according to reports received by the Department of Commerce from Paris and Berlin. The decision to increase the quota was made at a meeting in Paris on Jan. 11. The action taken was held to indicate confidence in improvement in export demand for wire rods. The increase in the wire rod quota is considered noteworthy in view of the decision of the International Steel Cartel to continue through February the prevailing 10 per cent reduction in output, which became effective Nov. 1.

United Steel Works Buys Westphalian Company

HAMBURG, GERMANY, Feb. 8.—One of the largest steel mills and blast furnaces in southern Westphalia, the Geisweider Eisenwerke, has been purchased by the Vereinigte Stahlwerke A. G., Düsseldorf, in conjunction with two other steel companies.

Recently the Vereinigte Stahlwerke A. G. and three other steel mills closed a contract for 8,000,000 metric tons of iron ore with a French group headed by the Acierie Marine de Homecourt. The ore is to be delivered in 10 annual instalments.

Decline in Steel Barrel Production

WASHINGTON, Feb. 21.—Production of steel barrels in January totaled 582,407 units, representing 48.7 per cent of capacity, against 624,365 barrels, or 54.7 per cent in December, according to reports received by the Department of Commerce from 27 producers. January shipments were 574,763 barrels, against 618,003 in December. Both production and shipments were the lowest since last November, when they totaled 572,621 and 567,257 barrels, respectively. Stocks at the end of January were 75,582 barrels, against 67,938 in December. Unfilled orders at the end of January, for delivery within 30 days, totaled 278,283 barrels, compared with 294,797 at the end of December. Unfilled orders at the end of January for delivery beyond 30 days were 1,130,228, against 1,044,136 barrels at the end of December.

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Shipments for the year 1929 by members of the Steel Barrel Manufacturers Institute totaled 6,089,686 barrels. Capacity (12,369,000 units) was engaged to the extent of 49.3 per cent, average. I. C. C. barrels, of which capacity is 2,347,500 units, absorbed facilities to 27.5 per cent. Light barrel capacity, 10,021,500 units, was utilized to 54.3 per cent.

Further Decline in Prices of Commodities

Commodity prices reported by the United States Bureau of Labor Statistics, on the basis of 550 items with index number 100 as the average in 1926, showed in January a continuance of the drop which has been going on for several months. The index stood at 93.4, compared with 94.2 in December and 97.2 in January, 1929. In contrast with the mixed movements usually in evidence, none of the ten major groups of commodities moved upward in January. Two showed no changes; four declined 1 point or less; three dropped between 1 and 2 points, and one, over 2 points.

Metals and metal products went down to 101.2 from 102.1 in December. The iron and steel component declined from 96.3 to 95.7; non-ferrous metals, from 101.5 to 100.6; automobiles, from 108 to 106.8 and "other metal products" from 98.6 to 98.4. Agricultural implements, at 96.1, showed no change.

In building materials, which remained constant at 96.2, structural steel stood at 97 both in January and in December.

More Coal in Hands of Consumers

Stocks of bituminous coal in the hands of commercial consumers on Jan. 1 are estimated by the Bureau of Mines at 40,300,000 tons, a slight increase over the 39,800,000 tons on Nov. 1. There has been a gain of 22 per cent since July 1 last, but the recent figure is nearly 4 per cent below that for Jan. 1, 1929.

Not all industries had the same margin of supplies. The average was sufficient for 28 days' use. Steel plants had 31 days' supply, by-product coke plants, 30 days', other industrial plants, 32 days', coal gas plants, 67 days', electric utilities, 45 days', and railroads, 21 days'.

Heppenstall Co. Celebrates an Anniversary

A convention and banquet attended by 100 employees on Saturday, Feb. 15, at the plant of the Heppenstall Co., Pittsburgh, marked the thirty-seventh anniversary of the connection of the president, Charles W. Heppenstall, with the enterprise. Just one year ago the company installed high-frequency electric induction furnaces for producing steel which was regarded as the pioneer step in the industrial use of this process in the United States. Speaking at the banquet, Mr. Heppenstall said: "New methods, more and better laboratory control are constantly improving steel, and electric-induction steel is more than a new method, because it has completely revolutionized certain phases of steel manufacture."

Unemployment in Buffalo and Philadelphia

Two unemployment surveys were made last year by the United States Bureau of Labor Statistics. A study among 58,866 wage earners in Philadelphia in April showed that 7.8 per cent were idle because of inability to obtain work, while an additional 2.6 per cent were idle on account of sickness or from other causes. The persons covered by the study were selected as a representative cross section of the population of the city.

It was found that the percentage of unemployment varied greatly among different groups. One-half of the 102 industrial blocks had more than 11.5 per cent of unemployment among their workers, while in blocks in which the professional occupations predominated the corresponding percentage was 1.8.

A similar survey of unemployment in Buffalo, in November, covered 15,164 persons. Of this number 821, or 5.4 per cent, were totally unemployed because of inability to find work, while the total number of unemployed from all causes combined was 1509; in addition 981 persons had only part-time work. Thus, of the whole group, 16.4 per cent were either idle or only partly employed.

Production of Fuels and Portland Cement in United States

	January, 1930	December, 1929	January, 1929
Portland cement production (a) (b)	8,498	11,215	9,881
do. do. shipments	4,955	5,951	5,707
do. do. stocks, end of month	27,094	23,550	26,797
Petroleum production, 12 months (a, b)	.....	1,005,598 (c)	.....
Gasoline do. do.	.....	434,241 (d)	.....
Bituminous coal, 3 weeks ended Feb. 15 (a, e)	32,864	.....	35,686
do. coal year to Feb. 15	459,810	.....	448,099
By-product coke (a, e)	4,203	4,181	4,360
Beehive coke (a, e)	309	345	479

(a) United States Bureau of Mines.
(b) Thousands of barrels.
(c) New high record, 67.6 per cent of world output; compares with 901,474,000 bbl. and 68 per cent in 1928; 901,129,000 bbl. and 71.4 per cent in 1927.
(d) New high record, displacing 376,945,000 bbl. in 1928.
(e) Thousands of net tons.

A metal gage giving the correct 59-deg. angle for sharpening or repointing twist drills is being furnished gratis by the New Process Twist Drill Co., Taunton, Mass.

Machinery Markets and News of the Works

Inquiries Are Increasing

Machine Tool Buying in Prospect Is Large, But Orders Show Little, if Any, Gain

THE outstanding feature of the machine tool markets is that inquiries are increasing, but orders are not. It is doubtful whether February sales will show any increase over those of January. If there is an increase, it will be small. However, there is a good volume of inquiry, indicating that manufacturers are preparing to make machinery purchases as soon as orders for their own products show a healthy increase.

In some metal working lines there have been gains, but these apparently are not sufficient to afford much stimulation to machine tool purchases.

Machinery sales have gained somewhat in the Chicago territory in the past ten days, but much of the business has come from two farm implement manufacturers and from the Santa Fe Railroad.

Many of the machine tool companies are now able to make reasonably prompt deliveries. In some instances night shifts have been discontinued or curtailed. At present operating rates, a good many tool builders have sufficient business to carry them into second quarter.

New York

NEW YORK, Feb. 25.—February sales of machine tools have not, on the whole, shown much improvement over the volume of January. In scattered instances, sellers may do a little better this month than last, but it is doubtful whether the general trend has been upward. On the other hand, inquiries have shown a healthy growth. Despite the fact that sales have not materially increased, if at all, sellers are of the opinion that the more active interest that is being taken by prospective buyers betokens a gain in sales soon. It is probably reasonably accurate to say that if the local trade had closed half of the machines on which quotations have been given this month the volume of buying would have been exceptionally good. Most of the inquiries are for single tools. The largest pending lists are those of the New York Central and Delaware, Lackawanna & Western railroads. The New York Central has inquired for about a dozen machines. The list of the Lackawanna road, comprising about 15 items, was published two weeks ago.

Board of Education, 500 Park Avenue, New York, has revised plans for four-story vocational school for boys at Tinton Avenue and East 147th Street, Bronx, to cost over $1,000,000 with equipment, and will soon ask bids on general contract. W. C. Martin, Flatbush Avenue Extension and Concord Street, Brooklyn, is architect.

North American Aviation, Inc., 39 Broadway, New York, operating Sperry Gyroscope Co., Inc., 40 Flatbush Avenue Extension, Brooklyn, manufacturer of precision instruments, has acquired Ford Instrument Co., Long Island City, manufacturer of precision tools and equipment, and will operate as unit of organization. Hannibal C. Ford, heretofore vice-president and chief engineer of acquired company, will continue as president of unit.

Skinnell Silver Plating Co., 155 West Twenty-ninth Street, New York, has leased floor in building at 248 West Twenty-third Street for expansion. It is understood that present works will be removed to new location.

Rubel Corporation, 937 Fulton Street, Brooklyn, has awarded general contract to York State Engineering & Contracting Co., Brooklyn, for one-story automobile service, repair and garage building in Ridgewood district, for company trucks and cars, to cost $100,000 with equipment. H. J. Nurick, 44 Court Street, is architect.

S. Rosenberg Toy Manufacturers, Inc., New York, has leased floor in building at 37 West Nineteenth Street for local plant.

New York Edison Co., 4 Irving Place, New York, has revised plans for extensions and improvements in Waterside generating station at 666-80 First Avenue, to cost over $100,000. E. M. Van Norden, address noted, is company engineer.

Queens County Motor Car Co., Inc., 103 Arleigh Road, Douglaston, L. I., has plans for a six-story service, repair and distributing building at Briarwood, L. I., to cost $230,000 with equipment.

Radio Corporation of America, Inc., Woolworth Building, New York, has acquired about 700 acres between New Brunswick and Bound Brook, N. J., for new short-wave transmitting plant, supplementing a similar plant at Riverhead, L. I., to include installation of steel towers, power transmitter station, mechanical and other units, to cost over $1,500,000 with equipment.

Tolhurst Machine Works, Inc., Troy, N. Y., has perfected a new machine for removing impurities from paper, and will give over part of works to quantity production of such equipment, including parts manufacture and assembling. Company is a subsidiary of General Laundry Machinery Corporation, 822 West Washington Boulevard, Chicago.

Alloys Foundry Corporation, Paterson, N. J., recently organized with capital of $25,000 by H. G. Lamker, 858 East Twenty-second Street, and associates, has leased a one-story factory at McBride Avenue and Jackson Lane, West Paterson, totaling about 12,000 sq. ft. floor space, and will establish foundry for production of aluminum alloy, copper alloy and kindred castings for aircraft and other service. Mr. Lamker, formerly foundry manager of Wright Aeronautical Corporation, is secretary and treasurer; C. P. Brown, formerly president of Mitchell Oil Co., is president, and H. J. Ness, who was sales manager of Walker M. Levett Co., New York, vice-president.

National Lock Washer Co., 40 Hermon Street, Newark, has asked bids on general contract for a four-story addition, 30 x 50 ft., including improvements in present four-story factory, to cost over $90,000 with equipment. Monks & Johnson, 99 Chauncey Street, Boston, are architects.

Public Service Electric & Gas Co., Public Service Terminal, Newark, has authorized a fund of about $27,000,000 for extensions and improvements in power plants and system; about $2,500,000 will be expended for work at steam-operated electric generating plants, including additional equipment, while about $5,000,000 will be used for construction of five new automatic power substations and improvements in a number of present such plants. Public Service Coordinated Transport, Inc., an affiliated organization, plans construction of several new bus service, repair and garage buildings, and extensions to several present such buildings, to cost over $400 000 with equipment.

Charles Motors, Inc., 197 Central Avenue, Newark, has plans for a two-story service, repair and garage building at East Orange, N. J., to cost about $140,000 with equipment. K. W. Dalzell, Haddonfield Road, Short Hills, N. J., is architect.

Eisler Electric Corporation, 730 South Thirteenth Street, Newark, manufacturer of parts and equipment for production of vacuum tubes, has arranged for purchase of plant and business of Tungsten Electric Corporation, New York, manufacturer of tungsten specialties. Purchasing company will continue operation of Tungsten organization under present name, with Dr. Clemens Laise remaining as head. Eisler organization is disposing of a stock issue to total $350,000, part of proceeds to be used for acquisition and expansion in output.

New England

BOSTON, Feb. 24.—Business the past week was not as good as anticipated. Sales reported included a boring machine, one large surface and several smaller grinders and drilling machines. Manufacturers are still exercising caution in making purchases. The used tool market has several promising prospects if the tools required can be found. Small tool sales have begun to creep up on the January record, an indication that metalworking plants are increasing output.

Edward J. Lamothe Co., Somerville, Mass., will close bids March 1 on a one-story, 97 x 137 ft., plant at Malden, Mass. Motors and miscellaneous electrical equipment will be bought.

Lever Brothers Co., Cambridge, Mass., soap manufacturer, has closed bids on a shipping unit. Conveying equipment will be purchased.

Monitor Patriot Co., Concord, N. H., has plans for a newspaper manufacturing plant to cost $100,000 with equipment. Miscellaneous mechanical and electrical equipment will be purchased.

State of Connecticut next month will take bids on power plants for a Mansfield, Conn., State training school and for a hospital, to cost $150,000 with equipment.

Eastern Massachusetts Electric Co., Washington Street, Salem, Mass., operated by North Boston Lighting Properties, Inc., 200 Devonshire Street, Boston, is planning construction of new superpower steam-operated electric generating plant on local tidewater, to cost about $15,000,000 with transmission system. Albert B. Tenney is president.

Rhode Island Ice Co., Woonsocket, R. I., has plans for new ice-manufacturing plant, to cost $100,000 with machinery.

Warren Telechron Co., Ashland, Mass., manufacturer of electric clocks, bells, etc., a subsidiary of General Electric Co., has plans for a two-story addition, to cost about $50,000 with equipment. Fay, Spofford & Thorndike, 44 School Street, Boston, are architects.

City Council, Boston, is considering an initial fund of $250,000 for extensions and improvements at municipal airport, including lease of additional 40 acres, new buildings, installation of equipment and facilities for seaplanes. An expenditure of $1,500,000 is proposed during next 18 to 24 months.

Plans are under way for reorganization of E. T. Burrowes Co., Portland, Me., manufacturer of screens, etc., recently in financial difficulties, and resumption of production. A special committee of stockholders has been formed and it is proposed to organized Burrowes Finance Co., to take over property and holdings, and perfect new organization.

Berkshire Automobile Co., 109 South Street, Pittsfield, Mass., has plans for a two-story service, repair and garage building, 60 x 200 ft., to cost about $110,000 with equipment. G. E. Haynes, 27 George Street, is architect.

Boston Elevated Railway Co., 31 St. James Avenue, Boston, is considering rebuilding machine shop at Harrison Avenue yard, destroyed by fire Feb. 13.

A. C. Gilbert, head of A. C. Gilbert, Inc., New Haven, Conn., manufacturer of electric fans, machanical toys, etc., and associates have organized Mecanno Co. of America, Inc., with capital of $100,000, to take over and expand division devoted to mechanical toys and novelties. Mr. Gilbert will head new organization.

Pittsburgh

PITTSBURGH, Feb. 24.—February business promises to be ahead of that in January with a number of dealers in this district, and fully equal to the preceding month with others. Most of this business, however, is accounted for by single tools and buying in volume is practically lacking. Users of machine tools are evidently purchasing only for immediate needs and budgets are being closely watched. Only a few important industrial lists are before the trade and scarcely any of these have been widely circulated. The same is true of the railroads, which are buying a few tools occasionally and not making known their future requirements.

Makers of rolling mill machinery are still receiving substantial orders. The Illinois Steel Co. expansion program in the Chicago district has benefited Pittsburgh district equipment builders materially. Most recent among the large steel plant enlargement programs is that of the Youngstown Sheet & Tube Co. which will build a mill for the continuous rolling of sheet steel at its Brier Hill works, Youngstown.

Fort Wayne Corrugated Paper Co., Fort Wayne, Ind., is planning new one-story plant, 150 x 350 ft., at Connellsville, Pa., to cost over $150,000 with machinery, for manufacture of cartons and other containers.

Union Electric Steel Corporation, Carnegie, Pa., manufacturer of forged hardened steel rolls, die blocks, etc., is planning expansion. Company has authorized increase in capital stock, part of fund to be used for such purpose.

Superior Paper Products Co., Carnegie, Pa., has asked bids on general contract for a one-story addition, to cost about $140,000 with equipment. Braziel & Anderson, 309 Fourth Avenue, Pittsburgh, are architects.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has acquired property at Mineola, N. Y., and plans early construction of factory branch and distributing plant, to cost over $100,000 with equipment.

West Virginia Stove Foundry Co., Huntington, W. Va., has plans for two one-story additions to be used for equipment to be removed from plant of Treasure Stove Works, Inc., Gallipolis, Ohio, recently acquired.

Alpha-Claude Neon Light Co., 231 Spahr Street, Pittsburgh, manufacturer of tube electric lighting products, has purchased local plant and business of Gardner Sign Co., 516 Grant Street, manufacturer of electric signs and displays, and will consolidate. Expansion in output will be developed.

United Zinc Smelting Corporation, 233 Broadway, New York, has awarded general contract to Wheeling Structural Steel Co., Wheeling, W. Va., for additions to plant at Moundsville, W. Va., to cost over $175,000 with equipment. A. T. Newell is in charge of operations at mill.

Holland Furnace Co., 538 Brownsville Road, Pittsburgh, manufacturer of domestic furnaces and heating equipment with main plant at Holland, Mich., has plans for one-story addition to local factory branch, storage and distributing plant, to cost about $30,000. Hannah & Sterling, 209 Ninth Street, Pittsburgh, are architects.

Buffalo

BUFFALO, Feb. 24.—Niagara Machine & Tool Works, Inc., 683 Northland Avenue, Buffalo, has plans for one-story addition, to cost about $40,000 with equipment. H. E. Plumer & Associates, 775 Main Street, are architects.

Wahl-Hesselink Plating & Mfg. Corporation, Rochester, N. Y., has been organized to take over and consolidate Wahl Plating & Mfg. Co., 35 South Street, and Hesselink Silver Plating Works, 17 Favor Street. New organization will carry out expansion and will be headed by Adolph Wahl and George H. Hesselink, heretofore heads of companies.

Plans have been arranged for merger of Valley Appliances, Inc., 634 Lexington Avenue, Rochester, manufacturer of radio loud speakers and other radio equipment, and Colonial Radio Corporation, 25 Wilbur Avenue, Long Island City, N. Y., manufacturer of radio sets, etc. A new corporation will be formed to take over and operate properties. It is proposed to continue each unit at present location. Dr. Fulton Cutting and W. S. Symington are heads. I. G. Maloff will be chief engineer for consolidated company.

John H. Hughes, 392 Mildred Avenue, Syracuse, N. Y., and associates have organized company under name of Group Parts, Inc., and plan early operation of local plant for manufacture of machine parts, tools, etc. Julian W. Edgcomb, Genesee Street, Skaneateles, N. Y., is interested in new organization.

Mathieson Alkali Works, Inc., 2400 Buffalo Avenue, Niagara Falls, N. Y., contemplates an expansion program to cost over $2,000,000, including buildings and equipment. Work will include development of soda ash properties at Saltville, Va.

Truck Equipment Co., Inc., 1791 Fillmore Avenue, Buffalo, has arranged for increase in capital from 1000 shares of stock, no par value, to $250,000 and 5000 shares of stock, no par value, for expansion.

Philadelphia

PHILADELPHIA, Feb. 24.—Morris, Wheeler & Co., Inc., Thirtieth and Locust Streets, Philadelphia, iron and steel products, has asked bids on general contract for one-story steel fabricating plant, 240 x 420 ft., to cost over $150,000 with equipment. Julian S. Simsohn, Broad Street and Girard Avenue, is architect.

Edwin A. France, 6736 State Road, Philadelphia, manufacturer of metallic packing, has plans for one-story machine shop addition, to cost about $30,000 with equipment. S. G. Matthews, 2016 Lippincott Street, is engineer.

Officials of Sun Oil Co., 1608 Walnut Street, Philadelphia, have organized Susquehanna Pipe Line Co., a subsidiary, to construct and operate storage and distributing plants, pipe lines and stations in State. Proposed system will approximate 500 miles in length and will connect with oil refining plant of parent company at Linwood, Marcus Hook, Pa., where expansion is now under way, to cost more than $2,500,000. Sun company has recently arranged for sale of stock issue of $5,000,000, part of proceeds to be used for expansion.

Universal Clock & Globe Corporation, Wilmington, Del., care of Arthur W. Swarts, duPont Building, recently formed by Mr. Swarts and associates, has

acquired factory at Thirty-fourth and Market Streets for new plant to manufacture electric clocks and time-keeping devices, and other instruments, including parts production and assembling. Mr. Swarts will be vice-president; H. E. Schulse is president, and Harry F. McQuale, secretary and treasurer.

State Board of Education, State House, Trenton, N. J., is asking bids until March 19 for boiler plant and underground electrical distributing system at Trenton State Teachers' College, Ewing Township. Guilbert & Betelle, 20 Branford Place, Newark, N. J., are architects.

American Chain Co., Bridgeport, Conn., manufacturer of steel chains, etc., has taken over plant of Hazard Wire Rope Co., Wilkes-Barre, Pa., for which purchase was recently concluded, and will continue operations as a unit of American Cable Co., 230 Park Avenue, New York, manufacturer of wire rope, cables, etc., an affiliated organization. It is planned to increase output. Lawrence W. Bevan, heretofore vice-president and general manager of Hazard company, has resigned his connection with organization.

William M. Hollinger, 632 Benton Street, Harrisburg, Pa., and associates have organized Railroad Switch Heating Corporation, with capital of $50,000, and plans early operation of local plant to manufacture railroad heating equipment and signal devices. Lloyd M. Basehoar, Trindle Road, Mechanicsburg, Pa., is treasurer; L. W. Snyder, Center Field Road, Progress, Pa., is interested in new organization.

Chicago

CHICAGO, Feb. 24.—Sales of machine tools in the past ten days have brought the total for February to about the figure for January. Much of this business has come from two large lists issued by farm implement manufacturers and orders recently placed by the Santa Fe. The outlook for March is favorable, based on inquiries on which bids have been submitted. At the moment, however, fresh inquiries are less than a week ago. The Eagle Sheet Metal & Mfg. Co., Chicago, whose plant was recently destroyed by fire, is seeking a new location and will come into the market for equipment replacements.

The Chicago Board of Education will buy a 9-in. x 4-ft. lathe and it is reported that a good sized list of machinery for several technical high schools will also be purchased. As a whole, the machine tool market is working its way into the hands of buyers. Competition is keen for going business and prices show unevenness.

United Autographic Register Co., Chicago, is building a new plant, 207 x 362 ft., at corner of California and Fiftieth Streets, to cost $1,000,000. Frank D. Chase, Inc., is architect and engineer.

Thomas Spacing Machine Co., Chicago, has moved its office from 176 West Adams Street, to 208 South La Salle Street, room 927.

Thomas W. B. Walting Mfg. Co., 701 West Washington Street, Chicago, manufacturer of coin-operated machinery, such as scales, etc., has leased former factory of Hershey Corporation, 4650 Fulton Street, 130 x 200 ft., for new plant, and will remove to new location in about 30 days. Hershey Corporation, manufacturer of locks and automotive equipment, now a unit of Houdaille-Hershey Corporation, has transferred its plant to North Chicago, where production will be concentrated.

Mosel Co., 2300 West Olive Street, Blue Island, Ill., manufacturer of wire goods, is planning one-story shop, to cost close to $25,000 with equipment.

H. E. Robertson Co., 630 North Franklin Street, Chicago, manufacturer of plumbing equipment and supplies, has leased factory at 2533 North Ashland Avenue, two-stories, totaling about 20,000 sq. ft. floor space, for expansion.

Central States Power & Light Corporation, Davenport, Iowa, operating electric light and power properties in several States, is disposing of a bond issue of $3,000,000, part of fund to be used for expansion and improvements, including acquisition of other properties. Company will take over gas properties of Rubana Oil Co., in Oklahoma, and will develop for natural gas service, including pipe lines, etc.

Nichols Wire, Sheet & Hardware Co., Davenport, Iowa, is planning to rebuild part of local wire manufacturing plant recently destroyed by fire. Headquarters are at Twenty-first and Main Street, Kansas City, Mo.

Peoples' Ice Co., 2801 Sixth Avenue, Des Moines, Iowa, has plans for a one-story and basement ice-manufacturing plant, 100 x 120 ft., to cost about $45,000 with machinery. Proudfoot, Rawson, Souers & Thomas, Hubbell Building, are architects.

Chamberlain Corporation, Waterloo, Iowa, has let contract for a factory, 60 x 100 ft. to manufacture its new ironer. About $19,000 will be spent for equipment.

The Crane Market

CONTRACTORS are becoming more active in the locomotive crane field and are providing a substantial share of the present inquiry. The Pennsylvania Water & Power Co. has closed on three 25-ton locomotive cranes for construction work at Safe Harbor, Pa., one with the Browning Crane Co. and two with the American Hoist & Derrick Co. The Central Railroad of New Jersey is expected to close shortly on a 30-ton locomotive crane, and the Standard Oil Co. of New Jersey, which inquired late last year for two 20-ton locomotive cranes, will soon have its 1930 appropriation available for their purchase.

Inquiry for overhead traveling cranes is slightly less active than a fortnight ago, and competition for business is increasingly keen. The New York Dock Co., 10 Bridge Street, New York, is reported to have closed on a 20-ton gantry crane for handling less than carload freight containers. The Puget Sound Pulp & Timber Co., Everett, Wash., has purchased a 3-ton, 3-motor, 16-ft. span, electric hoist transfer crane from the Box Crane & Hoist Corporation. The Gulf States Steel Co., Birmingham, is in the market for 10 overhead cranes for its new sheet mill at Alabama City, Ala. Overhead cranes to be purchased by the Illinois Steel Co. for its expansion program will total about $120,000 for the Gary works, and additional purchases for the South works will reach about $40,000.

Cleveland

CLEVELAND, Feb. 24.—Machine tool sales in this territory were light the past week. There is still considerable business in prospect, but a hesitancy is being shown by prospective buyers toward placing orders. The Conneaut Dock Co., Conneaut, Ohio, has an inquiry out for a large gap lathe, radial drill, shaper and upright drilling machine for its maintenance department. The New York Central Railroad has taken quotations for two small lathes and a sensitive drilling machine, but may defer purchase of these tools. The Cleveland Planer Co., the past week received an order for two machines for export, one for Mexico and one for South America.

Ohio Piston Co., 5337 St. Clair Avenue, Cleveland, manufacturer of engine pistons, etc., has plans for a two-story addition, to cost over $40,000 with equipment. E. G. Hoefler, 5005 Euclid Avenue, is architect and engineer.

Bonnar-Vawter Fan Form Co., Inc., is a consolidation of Vawter Manifold Co., Benton Harbor, Mich., and American Fan Form Co., Cleveland. Benton Harbor company will be transferred to Cleveland, where factory space has been acquired at Clark Avenue and West Sixty-eighth Street. Vawter Manifold Co.'s name was incorrectly given in our issue of Feb. 20.

Parker Steel Castings Co., Henry Street, Cleveland, has plans for a one-story foundry addition, to cost about $35,000 with equipment.

Libby-Owens Glass Co., Toledo, Ohio, has plans for an addition to sheet glass plant, to cost about $500,000 including machinery.

Henkel-Clauss Co., Fremont, Ohio, is planning to rebuild part of cutlery manufacturing plant recently destroyed by fire.

South Atlantic

BALTIMORE, Feb. 24.—Horace E. Dodge Boat & Plane Corporation, 3 East Fifty-second Street, New York, is completing initial units of new plant at Newport News, Va., where 100 acres was acquired several months ago, and plans to begin operations next month. Former works of Horace E. Dodge Boat Works, Inc., 614 Lycaste Avenue, Detroit, taken over by first-noted organization, will be removed to new location and additional equipment provided for manufacture of motor boats, flying boats, etc., including parts and assembling. New plant will represent an investment of more than $1,000,000. Philip L. Small & Associates, Terminal Tower Building, Cleveland, are architects and engineers.

Officials of Silica Gel Corporation, Garrett Building, Baltimore, have organized Silica Gel Dehydration & Refrigeration, Inc., with capital of $5,000,000 and 1000 shares of common stock, no par value, to manufacture and install cooling and refrigeration plants for domestic service. Parent organization has devoted interests to similar plants for industrial and railroad service. It is understood that American Radiator & Standard Sanitary Corporation, 40 West Fortieth Street, New York, will be identified with new company, of which E. Wilbur Miller, president of Silica Gel Corporation and Davison Chemical Co., Baltimore Trust Building, Baltimore, will be head.

Benedict Coal Corporation, General Building, Knoxville, Tenn., has plans for rebuilding steel tipple at mining prop-

erties at St. Charles, Va., to cost over $100,000 with conveying equipment, etc.

Atlantic Ice & Coal Co., 106 Collins Street, S. E., Atlanta, Ga., has begun expansion at cold storage and refrigerating plant, including additional equipment, to cost about $50,000.

Walker Foundry Co., Inc., Charlottesville, Va., recently organized by Charles M. Walker, Charlottesville, and associates, plans operation of a local foundry for production of iron and steel castings.

Liberty Lime & Stone Co., Inc., Rocky Point, Va., is planning extensions and improvements in properties, including installation of an electric shovel for quarry loading and other mechanical equipment.

Mexican Petroleum Corporation of Georgia, Savannah, a subsidiary of Standard Oil Co. of Indiana, 910 South Michigan Avenue, Chicago, has work under way on new local refinery, to cost over $350,000 with equipment.

American Oil Co., American Building, Baltimore, has plans for oil storage and distributing plant at Atlantic City, N. J., to cost about $80,000 with equipment. T. J. O'Connell, address noted, is company engineer.

Greer Eclipse Textile Device Co., Pelham, S. C., manufacturer of textile mill equipment, has plans for expansion and installation of additional machinery.

Milwaukee

MILWAUKEE, Feb. 24.—The upward trend in machine tool business continues slowly with considerable swelling in the volume of pending transactions. Orders are mostly in single units for replacement and come from widely scattered sources. Considerable business awaits the beginning of industrial building operations scheduled for about March 1. Deliveries have been somewhat halted as demand for machine tools increases.

Northern Conveyor & Mfg. Co., Janesville, Wis., has authorized purchase of new equipment coincident with increase of capital stock from $100,000 to $500,000. A new building, 160 x 200 ft., is under construction to facilitate adding several new lines.

Delta Mfg. Co., 1661-1667 Holton Street, Milwaukee, manufacturer of wood-working machinery and tools, has begun construction of a one-story addition, 40 x 90 ft. F. F. Drohlshagen, 447 Virginia Street, is architect.

Wisconsin Telephone Co., 418 Broadway, Milwaukee, will build a new automatic dial exchange, 210 x 244 ft., to cost about $200,000. G. F. Crowell is chief engineer.

C. H. Rimling, 2825 Clybourn Street, Milwaukee, will soon award contract for a garage and service shop, 83 x 135 ft. August G. Wolff, 613 Mitchell Street, is architect.

City Clerk W. B. Shuts, Kilbourn, Wis., will close bids March 5, for installation of steel water tank and tower for city water department.

Oilgear Co., Milwaukee, manufacturer of hydraulic feeds for machine tools and broaching machines, has plans for an addition, and installation of about $50,000 worth of new machinery. Company has been operating on night and day shifts almost without interruption since 1924 and during these years plant has been enlarged three times.

Federal Pressed Steel Co., Milwaukee, has received a contract from International Harvester Co. for entire requirements of heavy pressed steel bumpers for International trucks produced during 1930, estimated at from 100,000 to 150,000, production to begin in March and to reach an output of 300 units per day at end of April.

St. Louis

ST. LOUIS, Feb. 24.—J. R. Brockman Mfg. Co., 617 North Second Street, St. Louis, manufacturer of steam equipment and supplies, has engaged Klipstein & Rathmann, Security Trust Building, architects, to prepare plans for one-story plant, to cost about $100,000 with equipment.

Ranger Aircraft Corporation, 2121 Westwood Boulevard, Oklahoma City, Okla., formerly known as Coffman Monoplane Co., is planning expansion for production of multi-passenger aircraft of German-American type, including parts manufacture and assembling.

Indian Territory Illuminating Co., Bartlesville, Okla., a subsidiary of Cities Service Co., 60 Wall Street, New York, is arranging for an issue of 1,250,000 shares of common stock, no par value, part of fund to be used for expansion, including acquisition of Foster Petroleum Corporation, operating oil properties in same district; additional storage and distributing facilities will be provided.

Co-Operative Equity Exchange, Cimarron, Kan., has plans by Horner & Wyatt, Board of Trade Building, Kansas City, Mo., consulting engineers, for new grain elevator, including elevating, conveying, screening and other equipment, to cost over $80,000.

Ozark Chemical Co., Ritz Building, Tulsa, Okla., contemplates one and two-story addition, 40 x 100 ft., for acid production, to cost about $50,000 with equipment. C. M. Bush is general manager.

Board of Education, Board of Education Building, St. Louis, will take bids on general contract early in March for five-story vocational high school, with shop unit, 185 x 275 ft., and laboratory, 160 x 225 ft., to cost over $1,200,000 with equipment. William B. Ittner, Inc., Board of Education Building, is consulting architect.

Oklahoma Public Service Co., Tulsa Trust Building, Tulsa, Okla., has plans for two-story addition to steam-operated electric generating plant, at Weleetka, Okla., to cost over $300,000 with equipment and transmission system. Sargent & Lundy, 72 West Adams Street, Chicago, are consulting engineers.

Greenlease-Leis Motor Co., Twenty-eighth and Farnam Streets, Omaha, Neb., has plans for service, repair and garage building on Thirty-first Street, three-story, to cost close to $200,000 with equipment. G. L. Fisher, First National Bank Building, is architect.

Transcontinental Oil Co., Tulsa, Okla., has purchased properties of Fuhrman Petroleum Co., Okmulgee, Okla., including oil lands in State, as well as in Saline and McPherson Counties, Kan., and plans development.

City Council, Seneca, Kan., will receive bids until March 13 for one 500-gal. capacity centrifugal motor-driven pump, with accessories; one 500-gal. per min. centrifugal gasoline engine-driven pump, and one 40-gal. per min. vertical shaft centrifugal pump, etc., for municipal waterworks. Grant & Fulton, 525 South Thirteenth Street, Lincoln, Neb., are architects.

Board of Trustees, University of Nebraska, Lincoln, has plans for three-story engineering building, to cost $300,000 with equipment. Davis & Wilson, 525 North Thirteenth Street, are architects.

Indiana

INDIANAPOLIS, Feb. 24.—Emerson-Scheuring Tank Co., 1914 Singleton Street, Indianapolis, manufacturer of welded steel tanks and other steel plate products, has leased one-story building, 60 x 400 ft., at Indianapolis Industrial Center, for new plant. Present works will be removed to new location and additional equipment installed.

Board of Trustees, Indiana State Reformatory, Pendleton, is considering one-story trade school at institution, to cost $45,000 with equipment. A. F. Miles is superintendent.

Artificial Ice Co., 525 North Niles Street, South Bend, has plans for one-story ice-manufacturing plant, 38 x 195 ft., to cost about $45,000 with machinery.

Perfect Circle Co., Hagerstown, manufacturer of piston rings, is arranging for increase in capital, part of fund to be used for expansion and improvements, including acquisition of additional properties. Company is considering addition to foundry at Newcastle, to cost about $50,000 with equipment.

Patrician Art Metal Corporation, 2126 South Meridian Street, Indianapolis, manufacturer of lighting fixtures and equipment, has been merged with E. C. Chambers Sales Corporation, specializing in similar equipment. Consolidated company will concentrate production at 225 East Ohio Street, where three floors and basement have been taken over.

Harry Franke, 518 Mechanic Street, Fort Wayne, has awarded general contract to William E. Lee, 3802 Piqua Avenue, for one-story machine shop, to cost about $25,000 with equipment.

Portion of plant of Ames Shovel & Tool Co., Anderson, was destroyed by fire recently.

Cincinnati

CINCINNATI, Feb. 24.—While machine tool orders in February have been somewhat better than those last month, manufacturers state that there is still much to be desired. Inquiry, however, continues brisk, with consumers displaying interest in new equipment in preparation for anticipated increase in their own demand. Overtime and night shifts have been generally curtailed, while in many instances only day shifts are running. In fact, several plants, while operating full time in the machinery departments, have curtailed assembly divisions to five days a week. Unfilled orders are still sufficient to carry local factories until second quarter.

Lockwood Mfg. Co., 650 West Third Street, Cincinnati, manufacturer of bakers' pans and equipment, has awarded general contract to Ferro Concrete Construction Co., Third and Elm Streets, for one and two-story addition, 231 x 280 ft., to cost about $150,000 with machinery. John H. Deeken, 15 East Eighth Street, is architect.

New Idea Spreader Co., Coldwater, Ohio, manufacturer of farm machinery and equipment, has acquired plant and business of Sandwich Mfg. Co., Sandwich, Ill., manufacturer of gasoline engines, portable elevators, hay loaders and other farm equipment. Purchasing company has formed Sandwich-New Idea Farm Machines, Inc., to take over and operate Sandwich company.

Buckeye Steel Castings Co., South Parsons Avenue, Columbus, Ohio, has plans for extensions and improvements to cost over $100,000, including installation of additional equipment.

Lucey Mfg. Corporation, Grove Street, Chattanooga, Tenn., manufacturer of oil well drilling machinery, is planning expansion and improvements to cost about $55,000, including additional equipment.

Memphis Power & Light Co., Memphis, Tenn., has arranged for a bond issue of $2,500,000, part of proceeds to be used for extensions and improvements in power plants and system.

Chattanooga Coca Cola Bottling Co., 214 Fort Street, Chattanooga, will soon begin construction of two-story bottling plant, with automatic bottling machinery, conveying machinery and other mechanical equipment, to cost $100,000. Automobile service, repair and garage building will be erected on adjoining site. William Crutchfield, First National Bank Building, is associate architect.

George H. Mead, president, and other officials of Mead Pulp & Paper Co., Chillicothe, Ohio, have plans for organization of new company to be known as Mead Corporation, capitalized at $30,000,000, to take over and consolidate local company with Mead Paper Board Corporation, Dayton, Ohio, and Management, Engineering & Development Co., last noted place.

Chattanooga Stove & Foundry Co., Chattanooga, Tenn., has awarded general contract to John Parks Co., 315 Oak Street, for one-story foundry addition, to cost about $50,000 with equipment. Other units will be erected soon.

Fairchild Engineering Co., Dayton, Ohio, mechanical engineer and tool designer, has moved to Norwood Power Building. Harold J. Fairchild is president.

Detroit

DETROIT, Feb. 24.—MacDonald Engineering Laboratories, Inc., 131 State Street, Boston, will take bids in about 30 days for new plant at Oakman and LaSalle Boulevards, Detroit, to cost over $400,000 with equipment.

Consumers Power Co., Jackson, is planning construction of new gas generating plant at Royal Oak, near Detroit, including new gas holder and distributing system, to cost over $900,000 with equipment.

Consolidated Paper Co., East Elm Avenue, Monroe, has plans for addition for storage and distribution, replacing unit recently destroyed by fire, to cost over $125,000. Wernert & Taylor, Nicholas Building, Toledo, Ohio, are architects and engineers.

Grand Rapids Store Equipment Corporation, Grand Rapids, is contemplating branch plant at Los Angeles, to cost over $350,000 with equipment.

Ex-Cello Aircraft & Tool Co., 1200 Oakman Street, Detroit, manufacturer of aircraft equipment, tools, etc., has arranged for purchase of Airparts & Tool Corporation, 642 Catherine Street, organized a few months ago to take over and consolidate Wayne Tool Co., H. R. Krueger & Co., manufacturer of precision tools and machinery, and Wolverine Screw Co., manufacturer of special parts, crank ratchets, etc. All divisions will be acquired by Ex-Cello company, which will continue production at present locations and increase output.

G. W. Hubbard Hardware Co., 313 South Saginaw Street, Flint, has awarded general contract to Sorenson & Gross Co., Industrial Bank Building, for top addition to storage and distributing plant, to cost about $60,000 with equipment. E. Byers, Citizens' Bank Building, is architect.

Wood Hydraulic Hoist & Body Co., 7924 Riopelle Street, Detroit, has acquired plant and business of Hydraulic Hoist Mfg. Co., St. Paul, Minn., and will take over property at once. Purchased company will be operated as a subsidiary, with name changed to St. Paul Hydraulic Hoist Co. Parent company is considering construction of new unit for production of steel dump bodies for motor trucks, to cost over $60,000 with equipment.

Szeely Aircraft & Engine Co., Holland, manufacturer of aircraft engines and parts, etc., has arranged for increase in capital, part of fund to be used for expansion.

Forgings & Castings Corporation, maker of die block castings and hammered forgings, has moved from 2411 Fourteenth Street, Detroit, to 1101 Wanda Avenue, Ferndale, Mich.

Duluth, South Shore & Atlantic Railway Co., 602 West Superior Street, Duluth, Minn., will rebuild roundhouse at L'Anse, Mich., recently burned. C. E. Urbans is general manager.

Gulf States

BIRMINGHAM, Feb. 24.—White Packing Co., Parallel Street, Montgomery, Ala., meat packer, has plans for two-story addition, including improvements in present plant, to cost about $200,000 with equipment. Peter H. Henschien, 1637 Prairie Avenue, Chicago, is architect and engineer.

In connection with expansion under way at locomotive shops at Cleburne, Tex., Gulf, Colorado & Santa Fe Railway Co., Galveston, Tex., has plans for additional units, including engine house to provide for 36 locomotives at one time, with repair facilities and 125-ft. turntable; main equipment storage and distributing plant, 60 x 662 ft., and two similar units, 24 x 580 ft., and 24 x 192 ft., to cost over $200,000 with equipment. W. F. Howard is superintendent at shops.

Pascagoula Cold Storage & Ice Co., Inc., Pascagoula, Miss., recently organized by W. L. Lindinger, Pascagoula, and associates, has plans for ice-manufacturing and cold storage plant, to cost about $50,000 with machinery. E. K. Strahan, Inc., Pere Marquette Building, New Orleans, is consulting engineer.

Beaumont Iron Works, Inc., Beaumont, Tex., has awarded general contract to Tellepsen Construction Co., 3900 Clay Street, Houston, Tex., for one-story addition to foundry, estimated to cost about $55,000 with equipment.

Continental Electric Mfg. Co., Laurel, Miss., W. H. Jolly, president, has plans by L. W. Duffee, Laurel, architect, for one-story plant to manufacture electric specialties.

Texas Power & Light Co., Dallas, Tex., is planning extensions and improvements in steam-operated electric power plant at Trinidad, Tex., including additional equipment, to cost over $175,000. Additions will be made in transmission lines.

Petroleum Refractionating Corporation, W. T. Waggoner Building, Fort Worth, Tex., is considering construction of oil refinery near Pampa, Tex., to cost over $100,000 with equipment.

Houston Lighting & Power Co., Houston, Tex., is disposing of a bond issue of $2,000,000 part of proceeds to be used for expansion and betterments.

Scobey Fire Proof Storage Co., 311 Medina Street, San Antonio, Tex., has plans for second unit of new multi-story warehouse group, to be equipped as a cold storage and refrigerating plant, to cost over $150,000 complete. Engineering Service Corporation, Post Dispatch Building, Houston, Tex., is engineer.

Martin Wagon Co., Lufkin, Tex., manufacturer of wagons, automobile bodies, etc., is planning to rebuild part of mill and boiler plant destroyed by fire Feb. 15.

City Council, Marfa, Tex., has leased 270 acres and plans municipal airport, including hangars, repair and reconditioning building, and other units, to cost over $65,000.

Common Council, Waelder, Tex., is considering construction of municipal electric light and power plant, and will secure estimates of cost.

Board of Education, Lubbock, Tex., plans installation of manual training equipment in new two and three-story high school to cost $600,000, for which bids are being received on general contract until March 4. Peters, Strange & Bradshaw, Myrick Building, are architects.

Magnolia Petroleum Co., Dallas, Tex., is considering extensions and betterments in refinery at Corsicana, Tex., to cost about $60,000 with equipment.

Pacific Coast

SAN FRANCISCO, Feb. 20.—Firestone Tire & Rubber Co., Akron, Ohio, has plans for factory branch, storage and distributing plant, 100 x 150 ft., at Stockton, Cal., to cost about $200,000 with equipment. A similar plant will be built at Palo Alto, to cost about $175,000. Plans for both units are being prepared by Charles McCall, 1404 Franklin Street, Oakland, Cal., architect.

George A. Armes, president of General Engineering & Drydock Co., 1100 Sansome Street, San Francisco, and associates have acquired plant and property of Los Angeles Shipbuilding & Drydock Co., Los Angeles. New owners will operate plant in conjunction with San Francisco works, and plan expansion and improvements.

West Coast Glass Co., 3235 East Slauson Avenue, Los Angeles, has awarded contract to McClintic-Marshall Co., Pacific Southwest Bank Building, for three one-story factory units, totaling about 32,000 sq. ft. floor space, to cost over $85,000 with equipment.

Great Western Power Co., 437 Sutter Street, San Francisco, has plans for two-story addition to power plant, to cost over $400,000 with equipment. Weeks & Day, Financial Center Building, are architects.

Officials of Magnavox Co., 4250 Horton Street, Oakland, Cal., manufacturer of radio loud speakers and other radio equipment, have organized Magnavox, Ltd., to take over and expand present

company. Plans are being considered for a new plant at Chicago, or other city in Middle West, to cost more than $350,000 with equipment.

Procter & Gamble Co., Gwynne Building, Cincinnati, will take bids at once for new plant at Long Beach, Cal., consisting of two main multi-story units, 100 x 700 ft., and 100 x 500 ft., with group of 14 steel storage tanks and other structures, including power house, to cost $5,000,000 with machinery. Stone & Webster, Inc., Laughlin Building, Los Angeles, is engineer.

City Council, Idaho Falls, Idaho, is planning installation of new generating unit and auxiliary equipment in hydroelectric power plant No. 2 on Snake River, to cost about $90,000.

Newport Harbor Union High School District, Newport Beach, Cal., will build a one-story vocational shop at new high school to cost about $300,000, for which plans will be prepared by Marsh, Smith & Powell, Architects' Building, Los Angeles, architects.

Canada

TORONTO, Feb. 24.—Demand for machine tools continues to improve. Lists are appearing for new works under construction and some good sized orders are pending. The automotive industry is furnishing a large part of the current business, but a better call is developing from the machine shops and companies affiliated with builders of locomotives and rolling stock equipment. Local dealers look for an improved demand from the mining fields within the next few weeks.

Dominion Engineering Works, Ltd., Montreal, has established a new department for manufacture of mining machinery and has acquired ex-Canadian rights for Williamson Ball Mill. Company will also undertake manufacture of crushers, ore cars, filters and special machinery. Dominion Engineering Works has heretofore specialized in manufacture of hydraulic and pulp and paper mill machinery.

Feldspar Co. of Canada, Ltd., which is associated with plants in Cleveland and Warsaw, N. Y., will start work at once on erection of a plant at Brockville, Ont.

Bids will be called about March 1 by Thomas Guerrette, secretary-treasurer, Edmundston, N. B., for construction of a concrete dam and buildings for hydroelectric power development on Grand River, to cost $200,000. H. G. Acres & Co., Ltd., Niagara Falls, Ont., is consulting engineer.

Bates Valve Bag Co., Ltd., Cap de la Madeleine, Que., will build an addition to cost $40,000.

Imperial Oil, Ltd., Church Street, Toronto, contemplates erection of a plant at Halifax, N. S., to cost $1,000,000. I. G. Wheaton, Toronto, is engineer.

Canadian Marconi Co., Ltd., 211 St. Sacrament Street, Montreal, has awarded contract to Foundation Co. of Canada, Ltd., 1538 Sherbrooke Street, West, for a three-story factory at Mount Royal, Que., to cost $170,000. A number of sub-trades have also been awarded. Ross & Macdonald, 1 Belmont Street, Montreal, are architects.

Foreign

A CONCESSION has been secured by Tonopah Mining Co. of Nevada, Bullitt Building, Philadelphia, from Government of Nicaragua, covering development of copper properties in Prinzapolca district. Under terms of agreement, company is to construct and operate a railroad from seacoast to mining site, 50 miles, and to develop and operate copper deposits, including construction of mill and other units.

Swedish Cellulose Co., Sundsvall, Sweden, a subsidiary of Kreuger & Toll Co., Stockholm, Sweden, has authorized construction of new mill for production of kraft pulp near company wharves at Sundsvall. Plant will have initial capacity of more than 8000 tons per month and will cost over $500,000 with machinery. It is scheduled for completion in 12 to 15 months. Hammarsforsen Power Co., another subsidiary of company noted, will furnish part of power requirements for new mill, and has plans for construction of 70,000-volt steel tower transmission line from its hydroelectric generating stations.

S. K. F. Industries, Inc., 40 East Thirty-fourth Street, New York (Swedish Ball Bearing Co.), manufacturer of ball and roller bearings, transmission equipment, etc., has arranged for expansion of its German subsidiary, Vereinigte Kugellager-fabriken, Berlin. Control has been secured of Fries & Hopflinger, and Fitchel & Sachs, both operating plants for manufacture of ball bearings, etc., and these will be merged with first-noted Germany company; capital of latter has been increased to 40,000,000 reichsmarks (about $9,500,000), part of fund to be used for expansion program.

Kali Sainte Therese, Paris, France, operating potash properties, is arranging for an increase in capital from 40,000,000 to 80,000,000 fr. ($1,600,000 to $3,200,000), part of fund to be used for increasing output.

A company at Helsingfors, Finland, has approved plans for a new sulphite pulp mill at Toppila, to cost $880,000 with machinery. Project will include another mechanical pulp mill, to cost $1,400,000 with equipment, as well as a hydroelectric power plant on Niskakoski Rapids for power supply, to cost over $800,000 with transmission lines. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Finland No. 326322.

New Trade Publications

Screening Machinery.—Stephens-Adamson Mfg. Co., Aurora, Ill. Catalog of 16 pages, 8½ x 11 in., describing the new S-A model vibrator screen.

Oil Filter.—Michiana Products Corporation, Michigan City, Ind. Pamphlet describing the principles of design and operation, and method of cleaning H-W oil filters for gasoline engines.

White Brass.—Cramp Brass & Iron Foundries Co., Philadelphia. Bulletin 10 of 12 pages illustrates and describes uses for Parsons' White Brass "SA." It is said to be applicable to all classes of bearings, from those of marine engines to automobiles and airplane motors.

Ingot Molds.—Vulcan Mold & Iron Co., Latrobe, Pa. A four-page leaflet, with an accompanying reproduction of a blueprint of the McCormick universal spraying apparatus, discusses the use of Moldkote in coating ingot molds properly and quickly with the spraying apparatus referred to.

Acid-Proof Cement.—Quigley Furnace Specialties Co., 56 West Forty-fifth Street, New York. Booklet of 23 pages illustrating and describing a variety of uses for Quigley acid-proof cement, particularly in stack construction and in equipment handling hot acid gases.

Electricity for Industrial Heating.—Commonwealth Edison Co., 72 West Adams Street, Chicago. Bulletin of 45 pages illustrating and describing various installations for use of electricity for industrial heating. This includes heat treating, steel melting, brass and lead melting, core ovens, rivet heating, galvanizing, enameling, etc.

Steel Castings.—Nugent Steel Castings Co., Chicago. Bulletin No. 124, two pages, illustrated, discusses safes of Nugent steel and shows the effects of tests to corrosion.

Air Compressors for Cupolas.—General Electric Co., Schenectady, N. Y. A four-page illustrated leaflet describes this company's single-stage centrifugal air compressors for cupola blowing.

Electric Equipment for Handling Heavy Material.—General Electric Co., Schenectady, N. Y. Bulletin GEA-1232, 25 pages, illustrates and describes various types of modern machinery for handling bulk material, including iron ore, coal, etc.

Steel Boilers.—Lancaster Iron Works, Inc., Lancaster, Pa. Bulletin of 12 pages illustrating and describing Monitor U-tube house boilers formerly made by the Monitor Bi-Loop Radiator Co. These boilers have been on the market since 1888 and are being modernized by the Lancaster Iron Works.

Synchronous Motors.—General Electric Co., Schenectady, N. Y. Bulletin GEA-1191 of 85 pages, illustrating and describing various industrial installations of synchronous motors.

Air Preheater.—Air Preheater Corporation, Wellsville, New York. Bulletin 130, of 40 pages, illustrates and describes functions and advantages of air preheaters generally, and discusses in detail the features of construction of the Ljungstrom air preheater.

Specialized Refractory Cements.—Refractory & Engineering Corporation, 50 Church Street, New York. Bulletin of 12 pages, dealing with refractory cements for both boiler brickwork and monolithic construction.

Air Separating Unit.—Federal Pneumatic Systems, Inc., 127 North Dearborn Street, Chicago. Folder of four pages, illustrating and discribing laboratory air separating unit, to replace test sieves in cement plants, both in the laboratory and finishing department. This assembly carries practical screen tests up to 325 mesh, while air separation enables the chemist to fractionate the minus 325 into four definite parts.

Low-Temperature Coal Distillation.—Salermo Limited, 14 Waterloo Place, London, S. W. 1, England. Bulletin of 57 pages, dealing with the Salermo process of low-temperature coal distillation, also giving much matter relating to the nature and use of the products obtained when coal is subjected to low-temperature treatment. The booklet also describes possible future developments in this field.

French May Not Raise Tariff on Motor Cars

Recent developments in Europe pointing to concentrated action on the part of European manufacturers to challenge the supremacy of the American automobile in their market appear to have died aborning, says *Automotive Industries.*

The agitation showed indication of crystallizing with the introduction into the French Parliament of two measures designed to increase the tariff on automobiles, trucks and parts to a very marked degree. This move was represented by two separate bills, the first providing for an increase of duties on parts from 100 to 300 per cent of the existing schedules, and the other providing for an increase of duties on finished automobiles to 45 per cent ad valorem or on weight, whichever would provide the most revenue.

Present indications are that these two bills will be forgotten in committee, for a while at least.

The broader question of the whole European market reaction was brought to the fore by the widespread discussion of the French moves, and it was announced in Germany that the manufacturers of France, Germany, Belgium, Italy, Austria and Czechoslovakia had entered into an agreement to attempt to establish set limits to the importation of automobiles into their respective countries. So far as is known, no definite proposal along these lines was made to American manufacturers, for their participation in such an agreement, but some efforts were evidently made to sound out some of them to ascertain whether they would become voluntary parties.

Decline in River Steel Movement

Movement of iron and steel products on the Ohio River in the Pittsburgh district declined to 64,736 tons in January, according to the United States Engineers' office, Pittsburgh, as compared with 77,885 tons in December and 48,471 tons in January, 1929. On the Monongahela River, 58,784 tons of steel products was moved in January, as against 60,957 tons in the preceding month and 80,402 tons in the first month last year. Only 100 tons of steel moved on the Allegheny River last month, as compared with 400 tons in December. There was no movement in January, 1929.

United States Steel to Expand Alabama Mills

James A. Farrell, president, United States Steel Corporation, while on an inspection trip of the Tennessee Coal, Iron & Railroad Co. properties, announced that further additions at Fairfield, Ala., and the modernization of the Ensley works, including the rail mill, are contemplated.

Mr. Farrell was accompanied by Myron C. Taylor, chairman of the finance committee; I. Lamont Hughest, vice-president, and John Hulst, vice-president. The party arrived at Birmingham on Feb. 17 and departed the evening of Feb. 18.

In a statement issued while in Birmingham, Mr. Farrell, said:

"Corporation officials are now considering further additions to the Fairfield plant, particularly in the extension of its sheet mills and in the building of additional facilities for the further diversification of the company's products, and it is expected that this work will be commenced promptly, with a view to making the Fairfield plant one of the most important units among the plants of the United States Steel Corporation.

"It is further contemplated that the modernization of the Ensley plant will be undertaken at an early date. The Ensley plant has had a long and satisfactory record in the production of steel rails and kindred products, and careful study is being made with a view to further improvement of its producing facilities. This will involve the expenditure of considerable sums of money."

The Week's News Quickly Told

Current Events That Bear on the Course of Business

RETAIL trade throughout the country is generally dull, especially in the smaller stores . . . Wholesale trade centering in Chicago is reported to be better; good orders having been received from rural districts.

* * * * *

COMMODITY index declined sharply to 92.2, wheat and cotton influencing many other prices. Wheat dropped to $1 a bushel in Kansas City. Considerable quantities of grain in terminal elevators and a large, promising acreage of winter wheat tend to depress futures, which are now selling below the "pegged" price of the cooperatives, backed by the Federal Farm Board . . . Cotton is $2.50 cheaper per bale. Cane sugar from Cuba will not be restricted, since two-thirds of the mills have voted against the proposed curtailment.

* * * * *

DEPARTMENT OF COMMERCE has received reports from automobile financing companies that over 3,000,000 cars were financed during 1929 . . . Consumers in United States purchased 74,167 automobiles from General Motors Corporation in January . . . Eighty cars a day can be assembled at the new Constantinople plant of the Ford Motor Co. . . . National Automobile Chamber of Commerce agrees to spend $15,000,000 in the year in form of allowances to dealers so that some 400,000 old cars may be scrapped rather than resold. One object emphasized for the scheme is to remove dangerous and unsightly derelicts from the highways.

* * * * *

STOCKHOLDERS who have sustained paper losses on stock transactions will not be permitted to record them on their national income tax returns. Bureau of Internal Revenue has issued a bulletin stating that selling stocks merely to complete a transaction resulting in a loss, and then repurchasing them after indicating the loss on tax returns, is forbidden, unless the repurchase is made more than 30 days after the sale. Advance purchases made in anticipation of a sale for the same purpose are also subject to the 30-day regulation.

NATIONAL wealth in United States amounted to 360 billion dollars in 1928, according to the National Industrial Conference Board. The 1922 figure was 320 billions. The per capita wealth for 1928 is estimated as $3,000. Nevada has the highest per capita wealth, $7,338; Alabama, the lowest, $1,284.

* * * * *

GOVERNMENT ownership of coal mines with private operation was proposed by Frank Haas, Philadelphia engineer, before the American Institute of Mining and Metallurgical Engineers at New York . . . A British legislative measure to relieve the coal situation proposes shorter hours, a national arbitration board and marketing regulations . . . Substitution of fuel oil for coal by steamships is blamed by a New York harbor coal dealer for a decrease in earnings by one company that has averaged for the last five years only 2.8 per cent earnings on invested capital.

* * * * *

ELECTRICAL energy generated in the United States last year is put at 125 billions of kilowatt-hours by National Electric Light Association . . . Soviet Government has placed orders in the United States for four record size hydro-electric generators. Newport News Shipbuilding & Dry Dock Co. will make the turbines, and General Electric Co. the generators . . . Plans for new power houses, high voltage lines and sub-stations to serve Illinois have been announced by Super Power Co. of Illinois. Cost of the program is estimated at $80,000,000.

* * * * *

AIRCRAFT refinements displayed by exhibitors at National Aircraft Exposition, St. Louis, included engines, instruments and accessories. Sales of $3,000,000 were early reported . . . General Motors Corporation announced a plan whereby their automobile dealers will handle, service and repair Fokker planes. The plan includes insurance and time payment . . . Sharp price reductions were announced by several of the larger companies.

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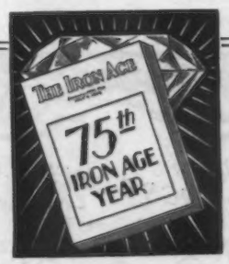

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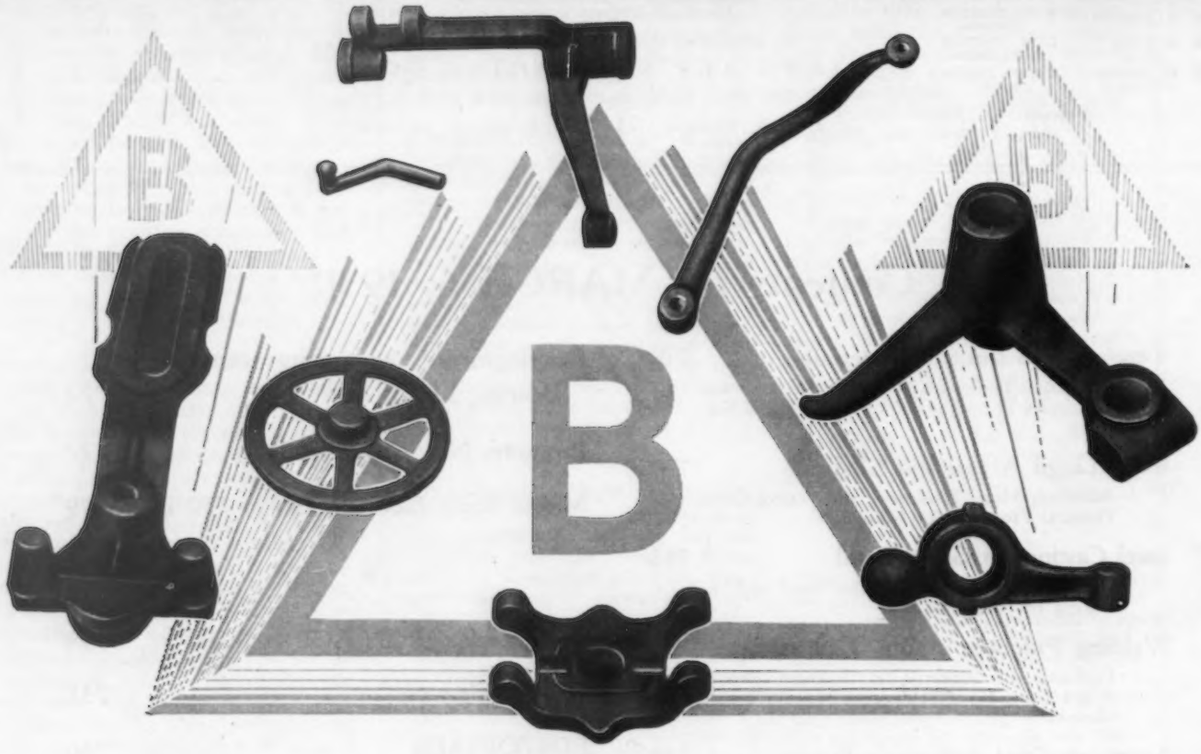

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